Assessing Community Telecentres

Guidelines for Researchers

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for the Acacia Initiative of the
International Development Research Centre

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FOREWORD

As we enter the 21st century, the International Development Research Centre (IDRC) is building on the momentum and excitement surrounding the new information and communication technologies (ICTs) to ensure that Africa's peoples are not left behind in the global information age.

Launched in April 1996, IDRC's Acacia Initiative works mainly with rural and disadvantaged communities in sub-Saharan Africa. These communities have generally been isolated from the technological advances that are changing the ways people are doing business and living their lives in the urban centres today. Acacia's program of research, experimentation, demonstration, and action supports the efforts of national governments to promote universal access to ICTs by building African capacities and bringing connectivity to poor communities through telephone, fax, and the Internet. Its central hypothesis is that connectivity and access to ICT-based tools and knowledge can enable communities to solve their own development problems and begin to close the information and development gap.

The Acacia Initiative is Canada's leading contribution to the African Information Society Initiative (AISI). AISI was adopted by the African Ministers Responsible for Economic and Social Development and Planning at their 31st session, in Addis Ababa in May 1996. It was endorsed the same week by the African Regional Telecommunication Development Conference, in Abidjan, and subsequently by the Heads of State of the Organization of African Unity, in Yaounde, and the Group of Seven, in Denver.

AISI is an action framework to build Africa's information and communication infrastructure. It aims to accelerate the economic and social development of Africa by promoting the use of ICTs on the continent. It is to be implemented by the Economic Commission for Africa (ECA).

Acacia is exploring a range of national models and promising technologies to increase access to communications and information. Among these are community telecentres. An early innovation in Africa, they can be found in various forms across the continent. Many questions about the community telecentres remain

unanswered: Do they meet real community needs? Do they stimulate new ideas and opportunities? Do they change social relations and economic patterns within and between communities? How can they be made financially sustainable and socially acceptable in the longer term? Are there some success stories to share?

Acacia and its partners are investing considerable effort to answer these questions in a program of evaluation and continuous learning that is grounded in the participation of community leaders and groups and links researchers and policymakers across Africa.

This report supports a pan-African approach to research on the roles and impacts of community telecentres. It was written primarily for the African research and policy community, but it would also be useful to those evaluating the effectiveness of community telecentres in other parts of the world.

Finally, it should be noted that the report raises an issue of some urgency. Although it recommends basing our understanding of community telecentres on the best research and information available, it also stresses the fact that community telecentres are springing up all over Africa without the support of studies to measure their impacts or determine what works best. Community telecentres may be a key to enabling rural communities to close the development gap, or they may be yet another expensive *cul de sac*. Acacia believes this publication will help to decide that issue and hopes that development researchers and policymakers will make extensive use of it in Africa and elsewhere.

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EXECUTIVE SUMMARY

These guidelines in this handbook are designed to support research and evaluation studies of community telecentres, particularly in Africa, where the Acacia Initiative of the International Development Research Centre (IDRC) and its partners will be undertaking such studies. The guidelines identify the key questions facing the research and evaluation team, propose alternative solutions and best practices based on experience from similar field situations, and facilitate comparability of pilot projects by providing a common reference and starting point. The structure of this handbook mirrors decisions on a variety of issues, from the initial development of hypotheses, through to the research design and sampling strategies, identification of variables and indicators, collection of data, and their ultimate analysis and interpretation.[1]

Section 1 discusses the rationale for the guidelines:

- The evaluation studies are urgently needed to provide an assessment of the role and impact of community telecentres, as organizations and donors are implementing these facilities in many parts of Africa without an adequate understanding of how well they respond to the communication and information needs of African communities (particularly, the rural communities) or of their impacts on social equity and economic development.

- Evaluation studies should include the participation of both local communities and national organizations, so an introductory volume on some of the key research issues might be useful in this regard.

[1] In this handbook, we do not provide an exhaustive treatment of any one of the many aspects of designing and implementing evaluation studies, as this would be impossible within one volume. However, at the end of this report, the reader will find many good references on specific aspects of research design, methodology, and analysis.

- The guidelines may encourage the research teams to share ideas, instruments, and methods, so that each of their case studies can contribute to a larger multinational research design — that of the Acacia Initiative itself — on community telecentres, their national policy environments, and the role of information and communication technologies (ICTs) more generally in sustainable development in Africa.

Section 2 emphasizes the importance of having an evaluation plan, with both an analytical framework for the evaluation and an implementation workplan setting out the necessary resources. The section recommends that the evaluation planning process include a multistakeholder process designed to enable telecentre stakeholders and the evaluation team to arrive at a common understanding of the objectives of the evaluation and the key dimensions of its implementation. It sets out the major research questions for community telecentre projects (Table 1) and the key information needs of the main telecentre stakeholders.

Section 3 concerns indicators, which are essential for achieving comparability across Acacia telecentre projects. Indicators for assessing telecentre performance and impacts are the conceptual link between the projects' objectives, key concepts, and data collection — the more overlap there is in indicators used, the greater the comparability. Section 3 discusses how indicators are developed for an evaluation and the criteria for assessing the indicators (Table 5). Based on other studies and some of the initial work on community telecentres, a series of tables present the indicators proposed for background information on the telecentres (Table 6) and the communities (Table 14); the communities' demand for telecentre services (Table 7) and for various types of information (Table 13); service performance (Table 8); and user behaviour and perceptions (Table 10). Some of the most important information for investors — whether local entrepreneurs, private-sector investors, government agencies, or international donors — concerns the financial feasibility of telecentres and the likely items to consider in their budgets (Table 11). The key objective of most evaluation studies will be to measure the telecentres' impacts on individuals, organizations, and the community as a whole. Section 3 proposes indicators for measuring the economic (Table 15), social (Table 16), and organizational impacts (Table 17).

Section 4 focuses on data collection, especially decisions on sampling methods and techniques for conducting surveys. It sets out four guiding principles for the Acacia Initiative:

- The information needs of the various telecentre stakeholders should be built into the decisions on data collection;
- Stakeholders should be provided with feedback from the study;
- Data collection should aim for comparability across projects, wherever possible; and
- Data sets should be shared in a common data archive or repository.

These guiding principles have implications for data collection, data disaggregation, and the use of multiple methods and multiple samples within any one study. Section 4 raises a number of issues concerning sampling — including the sampling frame, unit of analysis, types of samples, stratification and multistage sampling, and sample size and frequency — and undertaking surveys. It discusses what types of survey to use for various purposes, when surveys might not be useful, the alternatives to community surveys, and the need for community-level data. Section 4 briefly introduces two practical challenges: dealing with nonresponse in any survey and the problem of attrition in longitudinal surveys. The section concludes with a discussion of the theory and ethics of interviewing.

Section 5 reviews research methods and techniques to use in the study and evaluation of community telecentres. Some of these methods, such as questionnaire surveys, are more widely known (although their potential pitfalls may not be), whereas others may be less familiar, such as projective techniques, household budgets and diaries, and observation techniques. Other techniques, such as attitude scales and participatory approaches, may be familiar but not thought of in relation to telecentres. Section 5 covers routine monitoring of telecentre operations, as well as group techniques, such as focus-group, nominal-group, and Delphi techniques.

Section 6 provides an overview of the stages of data analysis and reporting. It again emphasizes that the needs of the various stakeholders must be taken into account in the data analysis and that the data sets are valuable, not only in their own right but also as components of a larger research design. Some of the implications for analysis are that researchers need to

- Document the analysis with great care, as other teams may be sharing the data;

- Agree on some common coding protocols in general and specific coding categories for certain variables;

- Review the theoretical models and assumptions underlying the collection of the data; and

- Know which are the explanatory variables and which are the variables to be explained.

This approach encourages the research teams to discuss the issues relating to analysis, including what statistical programs to use early on in the process, and, above all, to temper the common enthusiasm for throwing all the variables into a computer-program "mixing pot" and, instead, to use common sense in interpreting the variables and their relationships. The evaluation teams can share problems and solutions through mechanisms such as the Acacia Telecentre Research Network (ATRN), an electronic discussion group currently hosted by IDRC. Section 6 also deals with the Acacia Stakeholder Information System, which has several components, including ATRN; the research-data archives proposed for Acacia; government stakeholders; telecentre managers and operators; international partners; and, last, but not least, local community stakeholders. Each of these groups of stakeholders should be connected to the Evaluation and Learning System for Acacia through the coordinator and regional staff.

It is hoped that the researchers evaluating the first wave of community telecentres in Africa will find the approach and suggestions in these guidelines useful and will build on its recommendations to establish a common corpus of knowledge on the role of ICTs in development and to create and sustain an active research network.

1. INTRODUCTION

1.1 Purpose of these guidelines

The purpose of these guidelines is to provide a tool for use among research groups collaborating with the Acacia Initiative in Africa (funded by the International Development Research Centre [IDRC]). These groups can use this tool to evaluate and monitor community telecentres and to strengthen the complementarity of their research and the comparability of their results. It is hoped that the guidelines will help meet the information needs of Acacia's key partners in Africa — the International Telecommunication Union (ITU) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) — and be useful to other groups involved in assessing telecentres throughout the world.

The guidelines were developed in collaboration with research groups participating in the Acacia Telecentre Research Network (ATRN). Many of these groups are already actively engaged in evaluating pilot telecentre projects.[2]

The approach taken in the guidelines is based on four premises:

- *The stakeholders' viewpoints and needs are important* — It is important for evaluators to take account of the experience of community telecentres from the point of view of the stakeholders at three levels: the local (within African communities), the national (especially the agencies experimenting with or implementing community telecentres) and the international (where public- and private-sector donors are taking more interest in funding telecentre projects). The "telecentre horse" is out of the gate and is in danger of running ahead of any adequate understanding of how to ensure the financial sustainability of the telecentres and maximize their benefits. It is therefore critical that the information needs of these various stakeholders guide the evaluation.

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[2] The Coordinator of the Evaluation and Learning System for Acacia, Dr Heather Hudson, provided helpful ideas and constructive comments throughout the process.

- *The stakeholders should be involved* — The evaluation should be as participatory and locally based as possible and should involve research institutions in Africa, local-community organizations, and telecentre management and staff. The Acacia Initiative is committed to a process of continuous feedback and learning involving all stakeholders, especially at the local and national levels, so that participation and feedback become part of a learning system. This has implications for how evaluations are conducted.

- *Telecentre evaluations should be comparable* — Using common research frames, instruments, and indicators will help researchers compare the experiences of diverse community-telecentre programs. This does not mean uniformity, which can bludgeon local issues and nuances. It means comparability of results through the inclusion of a few core indicators, in addition to those reflecting local concerns. Strengthening comparability across evaluations of pilot telecentre projects in Africa is important because in most countries the number of telecentres in the pilot phase is small and therefore, without an international cross-sectional sampling frame, evaluation projects would be limited to individual case studies.

- *Baseline data should be collected and shared before it is too late* — The guidelines have been developed with a sense of urgency: an increasing number of pilot telecentres are becoming operational before anyone has collected any real baseline data on the communities, and this will make any evaluation of their impacts and benefits more difficult.

A word of warning

These guidelines are not designed to be a basic text on how to do project evaluation or on methods for conducting social surveys. Rather, they seek to review the main issues in making decisions on what to measure and how to measure it. They assume that the reader is already generally familiar with survey methods and evaluation or can access that information from standard texts, some of which are listed in the "Further reading" section of the bibliography.

1.2 Some key definitions

1.2.1 Telecentre

Telecentre appears to have no universally accepted definition, beyond the general concept of a physical centre to provide public access to long-distance communication and information services, using a variety of technologies, including phone, fax, computers, and the Internet. Telecentres can be publicly or privately owned, be part of a public or private franchise, or be provided by international donors. They run the spectrum from "phone shops" through to "cybercafés," cottage telecentres for telework or telecommuting, and specially constructed multipurpose community telecentres (MCTs), some with advanced services, such as medical diagnosis and telemedicine.

The earliest telecentres in Europe started before people had access to the Internet, but access to the Internet becomes important for telecentres once they progress beyond the status of the basic "phone–fax shop." Successful community telecentres will eventually need to provide related services, such as user training, distance education, keyboard and business training, "job shops," and community programs. Partly for this reason, some national programs locate their telecentres in existing institutions, such as libraries, schools, and chambers of commerce.

1.2.2 Monitoring, evaluation, and learning

These guidelines make a conventional and pragmatic distinction between ongoing performance monitoring, which tracks whether actual performance and results are on target for various stakeholders, and more discrete evaluations, discontinuous data collection, or analytic studies to assess issues such as the effectiveness, sustainability, and impact of programs. Telecentres can incorporate regular monitoring into their routine management tasks or make it part of regular online or desk-front reports from telecentre users. The evaluation helps to answer strategic questions about how and why certain outcomes arise, test the validity of research questions and assumptions, and examine the costs and benefits of alternative actions.

The learning system is based on a series of feedback, or learning, loops between the stakeholders at various levels; this feedback provides the stakeholders with adequate and timely information to underpin their management, investment, or other decisions. With a learning-system approach, the research, evaluation, and monitoring teams are responsible for providing feedback to all stakeholders, especially those involved in local management and national-program direction, and for framing research questions to respond to the information needs of these stakeholders.

The Acacia Initiative addresses activities and issues in community telecentres at several levels:

- Community or individual telecentre pilot projects;
- National telecentre program and policy;
- Regional and international comparisons of telecentre experience; and
- Evaluation of the initiative with respect to its specific objectives for telecentres and its hypotheses on the role of information and communication technologies (ICTs) in promoting sustainable development in African communities.

Each of these requires consideration within the overall evaluation framework.

1.3 The Evaluation and Learning System for Acacia

The Evaluation and Learning System for Acacia (ELSA) is Acacia's instrument for testing its core hypothesis that ICTs will enable poor communities in Africa to contribute more effectively to their own development. ELSA is designed to facilitate learning among people living in the project communities, project managers, the overall Acacia Initiative and its partners, and national- and international-level policymakers who can apply the results to further projects and programs. In the early phase, ELSA's main focus will be on assessing various community telecentre models and putting an evaluation system in place to measure the longer term social and economic impacts of the telecentres and other ICT interventions in project communities.

The emphasis on a continuous and interactive learning system in the Acacia Initiative is experimental. The aim is to use web-based electronic discussions (involving researchers and telecentre operators) to bring together community-based learning and more traditional research findings in a single, interactive framework and encourage communities to define their own needs for products, services, and content. Project communities are expected to eventually share ideas and resources with other communities; and researchers involved directly in the Acacia Initiative will use ATRN to share their ideas and research with other partners assessing community telecentres in Africa or in other parts of the world. These guidelines will play an integral role in that learning process.

2. The Telecentre Evaluation Plan

As early as possible in the evaluation process, each study should include a clearly defined exercise to "scope" the dimensions of the evaluation. This scoping exercise should result in evaluation objectives and criteria agreed on by the stakeholders, an identification of the necessary activities, and a workplan and budget. These constitute the initial evaluation plan. The evaluation plan will include both the analytic framework for the evaluation and an implementation workplan. One important component of the evaluation planning process is a multistakeholder process designed to enable telecentre stakeholders and those responsible for the evaluation to arrive at a shared understanding of the overall objectives of the evaluation and how they will be achieved in the different evaluation and monitoring activities. The multistakeholder process may necessitate meetings and other forms of discussion at local, national, regional, and international levels, depending on the context of the telecentre projects. Most important, at the outset of the evaluation study, the various stakeholders will discuss the procedures for reporting, interpreting, and disseminating the results.

2.1 Identifying the research questions

The logical place to begin an evaluation plan is with the questions you want to answer. You can pose two types of question (the following questions are given as examples):

- *Questions immediately related to the evaluation* — What size of population is needed to make the telecentre financially feasible?

- *More fundamental research questions* — What is the role of information and communication in development? How do the impacts of information technologies differ from those of other technological innovations introduced into African communities? Under what models of social change and economic development is the evaluation being conducted?

What are our assumptions about how information technology and content change political power relationships, social learning, or economic benefit?

These questions may seem too theoretical and far removed from the immediate concerns of the program manager, who wants to know how many people a telecentre adequately serves and how often the equipment is breaking down. However, these research questions are fundamental to the evaluator's efforts to frame hypotheses for an evaluation study. Too often, projects are designed and implemented without adequate attention being given to the scientific models or theories underlying them. Consideration of these underlying models early on in the evaluation planning process is important for two reasons:

- *Evaluators bring their own biases* — The evaluation team's assumptions about how community telecentres change people's lives will influence the questions the team asks and how it asks them. The team members should identify their own assumptions about the role of information in social change and how community development takes place, not only to identify the key research questions for the study but also to better recognize their own biases.

- *Research methods are not value free* — Evaluation designs and methods are each embedded in particular research paradigms, and the evaluation approach should reflect a scientific model of the phenomenon under study (in this case, the impact of information technology on individuals and communities). The broader research questions are fundamental to IDRC's rationale for launching the Acacia Initiative and thus become doubly important in evaluating the program itself, in addition to its individual projects.

What social-research questions might frame an evaluation of a telecentre project?

Some of the most important concern the social role of information. *Communication* can be defined as "the exchange of information and the transmission of meaning (which lead to action)." Katz and Kahn (1978) argued that it is the essence of any social system or organization. Communication is a social process fundamental to any group's functions: it is the means of motivating, influencing, and restricting social interaction, such as cooperation, conflict, and leadership. Communication

is organized information flow, ordered as much by limitations and restrictions as by openness.

The proper understanding of communication situates it in the context of a social system. Ashby (1952) conceptualized social systems as restricted information networks. Thus, the introduction of a community-access telecentre, if it is successful, is going to have a major impact on the community — its culture, communication patterns, economy, social structure, and future development — and the community will, in turn, determine the telecentre's sustainability.

Models of learning and innovation assume a pivotal role for information transmission and exchange. Such models stress that information without context is so much useless noise, and the lesson here is not only that community telecentres are social forces impacting on the community but also that they cannot succeed unless implementers give due attention to the types, sources, and quality of their information and the relevant applications, such as health care and education. Experience suggests that if the telecentres are seen as technology providers, rather than as social and cultural community centres, they will be less sustainable and provide fewer benefits.

Information has been described by some telecommunications enthusiasts as intrinsically unlike other resources, such as energy or water: rather than being depleted, information increases in value when people use and share it. This might indicate that information has no cost, but of course, access to information does have a cost, both for the individual and for the community, as does the provision of other basic human needs. Is greater access to information always a benefit? Probably not. When does increased information bring negative impacts, as well as positive ones? These are the kinds of question that research projects like the Acacia Initiative are designed to address (Table 1).

Information can come from within or outside the community, and the balance of the two sources of information creates community structure and development. Telecentres affect this balance between endogenous and exogenous information and the relationship between its various suppliers. Control of information has long been central to maintaining political power and economic advantage in many societies. Western ideas about patenting knowledge clash head on in Africa and elsewhere with traditions of free reciprocal exchange of valuable knowledge, such as knowledge about the use of plants. How does the social construction of information (and the Internet) affect the ways people view telecentres and the ways telecentres will change the social exchange of information within a community and between it and the outside world?

Table 1. Major research questions for Acacia telecentre projects.

Major research issues	Related questions
Will access to ICTs produce benefits for African communities?	• What will the social, economic, and cultural benefits be? • How will specific community organizations and institutions be affected? • How will benefits be distributed across individuals, groups, and organizations in the community? • Will the telecentre lead to more local development initiatives?
What negative impacts may result?	• To groups or individuals within the community? • To other communities? • How may the potential negative impacts be mitigated?
What are the impacts of increased community access to ICTs at the national level?	• Will it lead to new demands for participation in government and provision of services? • Which national organizations and agencies will be impacted and in what ways? • Will it increase economic productivity and prosperity? • How will the benefits and costs be distributed nationally (including urban–rural differences)?
What national policies are the key determinants of telecentre success?	• Telecommunications infrastructure? • Publicly supported national telecentre program? • Cost of connectivity and duties on equipment? • Open access policy for the Internet and e-mail accounts? • Government information and services online?
What characteristics of communities are indicators that telecentres will succeed?	• What are the boundary conditions in terms of population size and structure, economic activity, and family income? • What are the local infrastructure and facilities, including those for telecommunications? • Is local leadership a key factor?
Is community participation necessary and in what ways?	• How much investment is needed in securing initial local support? • Is a participatory, community-awareness approach best? • How involved does the local community have to be in the operations and finances of the telecentre?
How can the financial and social sustainability of the telecentre be achieved?	• What arrangements need to be made between national government, local authorities, telecentre owners, etc.? • What are the minimal conditions in terms of financial objectives and business planning for sustainability? • What subsidies are needed for start-up, and for how long? • What skills and training do telecentre operators need? • What are the critical factors in success?

(continued)

Table 1 (concluded).

Major research issues	Related questions
What needs to be done in terms of applications and information content to maximize the benefits of access to ICTs for communities?	• What are the main application needs, and how are they to be fulfilled? • How should community-generated information be shared? • How should telecentres be integrated with local radio, news sheets, or other media?

Note: ITCs, information and communication technologies.

Are information technologies, such as telecentres, intrinsically different from other types of technological interventions that we associate with development, such as water pumps or roads? Can we apply our long experience with these interventions to the telecentre programs? Is it more useful to look at the experience of community schools and libraries, on grounds that the relevant lessons for telecentres are more related to social programs than technological innovation?

How should research and evaluation of telecentres distinguish information, communication, and knowledge in practical terms? Knowledge is information meaningfully structured into concepts and facts to achieve some end. This implies the need to examine the use and impact of information within a specific knowledge context to judge whether it is relevant, timely, understandable, and of practical benefit to the user. At one level, the assessment of telecentres is inseparable from the information and knowledge that flow through the telecentres and the resulting behaviour and effects. At another level, telecentres are service centres and places of social interaction. Because telecentres generate new knowledge, learning, and patterns of behaviour, we must evaluate them not only as a new technology, but also as a set of social processes mediated through a technology.

2.2 Systems approaches to evaluation

> Program evaluation as a distinct field of professional practice was born of two lessons. ... First, the realization that there is not enough money to do all the things that need doing; and second, even if there were enough money, it takes more than money to solve complex human and social problems. As not everything can be done, there must be a basis for deciding which things are worth doing. Enter evaluation.
>
> — Patton (1997, p. 11)

Program evaluation developed in the 1960s to meet the need to prove the value of publicly funded social projects. The 1960s also saw the rise of the scientific method in the social sciences and an emphasis on experimental design, statistical significance, and identification of causes. Although evaluation methods have evolved considerably since then, they are still heavily influenced by the need to measure performance for accountability purposes. Concern with accountability focuses partly on returns on financial and other investments in a program and partly on its initial objectives and the success of program management in obtaining these objectives. Evaluations undertaken in this mould do not deal very well with a program that learns as it goes along and changes its objectives and activities midstream. Nor are they particularly appropriate for programs that are so successful that they result in major transformations in the project communities. Most evaluations are designed to measure incremental changes along predicted (outcome) trajectories. In other words, traditional evaluation models do not necessarily deal well with adaptive, complex systems, which is what human communities and social-information systems are.

An important lesson from general systems theory is that one of the first steps in designing an evaluation project is to map out, or model, the system under evaluation: its components, connectivity, and feedback loops; boundaries; inputs, throughputs, and outputs; behaviour; and critical thresholds. The next lesson, this one provided by complex systems theory, is that the general systems model is a gross oversimplification of reality, as human systems are never linear but develop with a good measure of surprises and uncertainty. A human system is an adaptive, or learning, system. When the process of change reaches some critical state, an apparently linear change can suddenly lead to a dramatic development or reversal of a characteristic (as described in catastrophe theory, or "the straw that broke the camel's back"). The third lesson for evaluation, this one taken from the history of science, is that science, and thus the evaluation, is contextual and value laden, carrying the burden of the values embedded in the theories, methods, and value systems of the evaluation team.

What are the implications for the telecentre evaluation plan?

First, the evaluation should make its assumptions explicit, and the evaluation team should be prepared to have these assumptions challenged. In fact, the team should even encourage this. Second, although limitations and biases are unavoidable, evaluators can compensate for them by involving as many diverse stakeholders as

possible. The evaluation should include a stakeholder consultation process. Third, because each method and instrument adopted in an evaluation study originally stems from a particular scientific paradigm, the evaluation team needs to reflect on these assumptions to determine whether they are consistent with its overall approach. Fourth, the design of the evaluation study should not be overly rigid but should be open to new discoveries and pose new questions, even after the project is under way. In other words, the evaluation study itself should be an adaptive learning system. Fifth, the evaluation study should include diverse methods and research instruments to capture diverse types of information.

Discussions such as these are particularly important in the evaluation of telecentre projects because telecentres change the patterns of information and communication in communities, and these communities are inherently adaptive, complex systems; projects implemented in these systems are likely to have unexpected and decidedly stochastic outcomes. It will be surprising if there are not surprises in the assessment of community telecentres. But the large financial and political investments in community-telecentre programs will tend to drive the focus of the evaluation toward the shorter term objective of accountability and away from "fuzzy" research questions. Research and evaluation teams should take the time to achieve a balance between the two and include some discussion with stakeholders about longer term research questions and alternative models of community development.

The key elements of the Acacia adaptive-systems approach are as follows:

- Develop a systems model for the program or project to be evaluated to scope the evaluation;
- Identify the stakeholders in the project and their information needs;
- Test your scoping model with various stakeholders to develop a working model for the evaluation;
- Design the evaluation or research study to be adaptive to new information and diverse information needs, and adapt your working model;
- Include a variety of methods and research instruments to obtain diverse types of qualitative and quantitative data;

- Develop a workplan to achieve the goals of the evaluation within the available budget and time frame;

- Be as participatory as possible in conducting the research and evaluation by including representatives of the various stakeholder groups in data collection and interpretation and using self-assessment as part of the evaluation tool kit;

- Select an evaluation and research team with credibility among the various stakeholders and with both internal and external expertise; and

- Ensure that the evaluation team and stakeholders interact throughout the evaluation or research study and that the evaluation itself contributes to learning and adaptation at all levels.

2.3 Identifying the stakeholders

Projects and their evaluations have multiple stakeholders. The evaluation plan should identify who they are and, if possible, "map" how they are either separate or clustered together in groups by their interests (stakes) in the project. This may simplify the otherwise daunting task of dealing with large numbers of stakeholders, some of whom may be relatively peripheral to the evaluation. Table 2 gives examples of potential stakeholder groups in a community-telecentre project. The evaluation team can identify the stakeholders as part of its exercise in mapping the project system. Once the team has identified the main stakeholders, it can use a "snowball" strategy, asking each stakeholder to identify others potentially interested in the project or evaluation, until the evaluators are reasonably confident of having included all key stakeholders.

What might the stakeholders want to know?

The snowball strategy also enables the evaluation team to identify what the stakeholders expect from the evaluation study. This information will provide an input to the study design and allow the team to map the various stakeholders' interests. Those involved in operating the telecentre are likely to be particularly interested in its financial sustainability, and they will need detailed quantitative information on revenues and earnings in the context of the population served (see Table 2). Stakeholders at the national level, such as ministries, may want information about

Table 2. Telecentre stakeholders and key information needs.

Level	Stakeholders	Key information needs
Community	• Civic authorities and leaders • Institutions (police, hospital, schools, etc.) • Business associations, chambers of commerce • Community action groups and NGOs • Sectoral interests (students, women teachers, etc.) • Individuals	• Telecentre performance • Community impact • Applications development
Telecentre	• Owner, franchisee, management • Community-liaison group • Operator, staff, volunteers • Funders, supporters • Users	• Telecentre performance • User needs and satisfaction • Financial sustainability • Community needs and impacts
National	• Agency responsible for telecentres • Telecommunications ministry • Other ministries (especially those involved in information provision) • Policy-making bodies	• Policy and regulatory environment • Financial sustainability • Applications development • Community impact • Regional comparisons
Regional	• Other national agencies responsible for telecentres, telecommunications • Other policy-making bodies • Regional organizations (e.g., ECA)	• Policy and regulatory environment • Financial sustainability • Regional comparisons
International	• Acacia–IDRC, ITU, UNESCO • Other international donors • United Nations and other international organizations, including World Bank • International NGOs, academia • Private sector	• Regional comparisons • Policy and regulatory environment • General community impact and sustainability indicators • Applications development

Note: ECA, Economic Commission for Africa; IDRC, International Development Research Centre; ITU, International Telecommunication Union; NGO, nongovernmental organization; UNESCO, United Nations Educational, Scientific and Cultural Organization.

the impacts of telecentres on their programs, such as youth employment or improved medical service, or about the demand that telecentres create for government information online or on call. Stakeholders in the international-donor group may have a specific interest in information relating to the goals of their own programs, such as the impact of telecentres on women's political participation or the

operations of local nongovernmental organizations (NGOs). Stakeholders at the national, regional, and international levels will likely be more interested in comparisons across telecentre projects and more generally valid indicators of financial sustainability and community impact. These indicators may only be determined in the light of comparisons across various telecentre evaluation studies.

The evaluation plan should include a consultative process with a representative and manageable subset of stakeholders. This process may include multistakeholder consultations or smaller meetings with individual stakeholder groups or leaders. The evaluation team should be confident that it has identified the stakeholders, their information needs, and their expectations for the evaluation and that the stakeholders are regularly informed about the progress of the evaluation and its findings. Some stakeholders are likely to have unrealistic expectations for the evaluation study, and it is better to work this through with them before the final report is in their hands. An effective way to achieve several of these objectives is to allow appropriate individuals from some stakeholder groups to participate on the evaluation team and in data collection.

Stakeholders sometimes have conflicting interests in a telecentre project. Managing multistakeholder processes may demand mediation, negotiation, and conflict-resolution skills and almost always requires patience. The evaluation team will have to decide how best to design the stakeholder consultative process, keeping in mind the particular circumstances and personalities involved in the process. Sometimes a multilevel approach is the most cost-effective and practical. Using this approach, the evaluators consult local, national, and international stakeholders in different forums, although some exchange of views between these groups can also be revealing for the evaluation team and mutually enlightening for the team and the stakeholders. Because an evaluation study should be responsive to new events and information, its design should be open to modification in the light of feedback from stakeholders.

2.4 Evaluation design

The evaluation design includes several interrelated components: the purpose of the evaluation, the research design, the sampling frame, the selection of indicators and primary and secondary data to be collected, the selection of research methods and instruments, and the type of analysis and reporting. There is no one ideal design for an evaluation or research study. All studies involve compromises in the light of on-the-ground circumstances and the realities of resource constraints. To obtain

results as accurate as possible, given the available time and funding, many trade-offs are made between survey design, sample sizes, and the types of data collected.

These guidelines are no substitute for the many excellent manuals dealing with various strategies for evaluation surveys. The purpose here is to highlight some of the questions that need to be addressed to help researchers arrive at more comparative studies of telecentres across the Acacia Initiative. It should be noted that evaluation exercises are useful as business-planning and marketing tools, as they can produce crucial information on what services should be offered and will be profitable and what the customers need and are willing to pay for. Evaluation design questions include the following:

What will the research design be? Will the survey be a single survey, a longitudinal survey, or a cross-sectional one?

A key question for the research design will be whether to operate with single or repeated data collection, and whether the latter will use the same respondents or different samples of the population on different occasions. Longitudinal surveys collect data from the same respondents on different occasions and likely supply the most accurate information. But they are the most expensive and suffer from their own problems: respondent attrition and bias through repeated interviews.

How will baseline data be collected?

The evaluation of telecentre impacts requires some baseline (pretelecentre) data. These data can be obtained in several ways: a baseline survey before the telecentre is operational; a retrospective survey after the telecentre is operational, in which respondents answer questions about the pretelecentre situation; or a cross-sectional survey, in which some communities without telecentres are used as controls. A macroresearch design could be constructed across various telecentre programs to provide longitudinal and cross-sectional data for the Acacia Initiative. This approach may provide surrogate baseline data for telecentre projects already in operation, at least on some key indicators.

How is the population for each telecentre to be defined?

What is the definition of *telecentre community*? It could be the population living within a specified geographic area, an administrative unit, or some measure of the population served. Evaluators will have to establish a clear definition.

What subsamples will be selected for study?

An important design decision will be which subgroups of the population to survey. These may include the early adopters, leaders of community organizations, telecentre users, or particular economic or social groups. Several subsamples of the community are likely to be chosen within any evaluation study.

How will community-level variables be measured?

A key decision relates to the way the general population or households within the community will be surveyed. For a number of reasons, statistically robust samples using random sampling of total populations is impracticable in developing countries, where face-to face interviews are necessary, up-to-date and complete records of residents are unavailable, and cost is a major factor. Alternative strategies are to select households according to location and to interview in other locations (telecentres, schools, community meetings). Each of these strategies will have costs and benefits in terms of sample bias and ease of conducting the survey. They are discussed further in section 4 on data collection.

What primary and secondary data are to be collected?

The evaluation team will pay most attention to questions related to primary-data collection, such as performance reports, interview surveys, and focus-group discussions. But it may also examine secondary sources, such as government statistics, census data, and telecommunication records because, where available, they are quick, cost-effective, and useful for cross-checking primary data.

For household surveys, who will be interviewed in each household?

The usual choices for respondents in household surveys are the head of household, the adult who comes to the door, or all household members who are available to answer the questions. Although these are the most practical choices, they can introduce systematic bias, which the interviewers can be overcome only with extra effort, such as by revisiting the household or carefully selecting a time to come back. For example, people at home during the day are less likely to be the employed members of the household, and the researchers may specifically wish to survey employed people.

Sometimes the questions relate to the respondent herself or himself, and sometimes the researcher asks one member of the household to answer on behalf of the others. In the case of telecentres, the views of young people who are potential users would be of particular relevance.

How will ongoing monitoring be undertaken? How will these data feed into the evaluation?

The evaluation study should incorporate routine monitoring of use, users, and equipment performance as part of the business management of the telecentre, including data-entry and phone logs.

2.5 Resource planning

Whether the telecentre evaluation is part of a research project or a separate evaluation study, it will require considerable investment of resources, including money, time, and people. It is worth planning the allocation of these resources carefully, especially if some can substitute for others. With participatory methods, for example, it takes longer to collect and analyze data but may cost less in expert salaries and travel. Evaluation studies generally cost around 5–7% of a project's total budget, depending on the evaluation design, the number of years needed to complete the research, and the type of data required by the stakeholders.

Resource planning should include the following:

- *Evaluation budget* — The evaluation budget includes staff salaries and benefits, consultants, travel and per diems, supplies and equipment, research materials, communications, reports, and other office costs. It is not uncommon for evaluation budgets to be underestimated, especially if the initial budget is set by the national telecentre program managers. So be prepared to ask for more or make the stakeholders aware that budget restrictions will limit the scope or quality of the evaluation. Try to avoid the twin problems of inadequate resources and program managers with unrealistic expectations.

- *Workplan* — The workplan should identify all the activities to be undertaken, the time they will take, their schedule, and who is responsible for which activity. As evaluations never go exactly as planned, the name of the game is flexibility in scheduling and in the choice of who does what. Provide for specific points in the schedule to discuss the workplan with the relevant stakeholders and, if necessary, modify the workplan, with their agreement. Particularly challenging is a situation in which new information requires a mid-course decision to change the data to be collected. The workplan has to accommodate such changes, sometimes without the benefit of additional resources.

- *The evaluation team* — The evaluation team is a group of people with complementary skills and experience, including some who are external to the community, along with others actively involved in the community or the telecentre's operations. Each evaluator brings a unique set of skills and perspectives to the evaluation and strengthens the end result. The internal people will certainly know the community better and may play the role of liaison or interpreter within the evaluation team. They may or may not have the technical skills of an external evaluator, but they will certainly bring an internal perspective and in-depth understanding to the group. These are the people who should lead the community in self-assessments (see section 5). Those who are involved in managing or operating the telecentre will also have a role to play, such as in surveys of telecentre users. Clearly, the more participatory the approach, the more the local people will be directly involved in data collection and interpretation.

  In the planning phase of the evaluation, the team should carefully consider its composition, with a view to meeting the needs for inside and outside perspectives and technical expertise. The personal qualities of outside evaluators are as important as their technical skills. They must respect the local people and be willing to work closely with them, be prepared to solve problems, and be patient in dealing with personality conflicts or when just explaining what the study is about. In some cases, they may have to resist pressure to make a positive report; in others, they may have their own credibility attacked. Evaluation studies can engender many tensions within a project. Mistakes in the selection of the evaluation team, especially in choosing its leader or leaders, are costly in terms of the success of the assessment exercise and are hard to undo.

2.6 Developing an evaluation framework

A key part of evaluation planning is developing a framework to understand how the project works. What are its objectives? How are they related to inputs, activities, and outputs? In other words, how would you describe the telecentre project as a system? A system is usually described in terms of its components and how they are linked together to achieve its purpose; it inputs, throughputs, and outputs; its purpose; and its external environment.

A description of the telecentre as a system would include the following:

- *Components* — Equipment, staff, owners, users, nonusers, and information suppliers;
- *Environment* — The local-level environment, including community population, local economic activities, family income, educational levels, infrastructure, and services like schools and clinics; and the national-level and international-level environments, including national telecommunication policy, availability of Internet service providers [ISPs], and attitudes of international donors;
- *Objectives* — Economic objectives, like obtaining financial sustainability; and program objectives, like providing universal access to telecommunications or fulfilling national-program policy objectives; and
- *Activities* — Providing telephone and fax services, Internet access, training sessions, business-support services, promotion, etc.

Scoping the telecentre system

At the beginning of any assessment or evaluation process, the evaluation team and key stakeholders should engage in an explicit and deliberate exercise to

- Map out the telecentre system;
- Describe the team's understanding of its structure and how it operates within its environment;
- Identify critical conditions and limitations;
- Agree on the objectives of the project;
- Define its inputs and outputs; and
- Agree on what indicators to use to measure its behaviour, characteristics, and impacts.

The advantage of this approach is twofold: it ensures that the evaluation team has an overall and systematic understanding of the project (which should be updated regularly throughout the assessment process); and it is a group exercise that should involve the whole evaluation team and as many key stakeholders as possible, so that everyone has a negotiated, shared vision of the evaluation.

In practice, the scoping exercise can range from an informal process involving only the evaluation team to a major multistakeholder workshop held over several days, when participants and a facilitator work through a series of steps together. A group exercise also acts as a buying-in process, in which ambiguities and differences in understanding are brought into the open and at least partially resolved for the purposes of the evaluation project. The group exercise will also ensure that the model of the project system that is constructed is as complete and accurate as possible.

Some development agencies recommend a type of systems analysis for evaluation called the logical-framework approach (LFA), or logframe. LFA has a formal methodology that is sometimes criticized for being too rigid, especially when applied to complex social systems requiring a more flexible, adaptive-systems approach. A community system can change radically and unexpectedly when its information and communication patterns are altered. Table 3 lists the main tasks of a scoping exercise, based on the LFA approach.

One result of undergoing a systems-framework exercise may be to choose a different level of analysis for the evaluation. For example, an initial focus on a single telecentre may be expanded to a wider evaluation of a telecentre program after discussions with national-program authorities and the realization that some common indicators are already available or could be easily collected across various communities. Sometimes an early focus on the operation of a single service centre, such as a telecentre, may be increased in scope to include the community itself as the system under study, and the telecentre is then reduced to just one component. In this case, the evaluation may collect additional data on the community and on other service facilities to better understand their relationships. Alternative ideas about the best level of analysis will emerge from discussions with stakeholders and within the evaluation team in the planning phase of the evaluation.

Table 3. Tasks of a telecentre scoping exercise.

Main tasks	Steps
Stakeholder analysis	1. Identify all groups that have an interest in the project or will be affected by it 2. Select the most important groups for more detailed attention 3. For those groups, identify their interests, strengths, weaknesses, and linkages with other groups
Problem analysis	1. Identify the focal problem, or the crux of the problematique 2. Develop the problem tree, in which cause and effect relationships are arranged 3. Reach agreement on the focal problem and the main components of the problem tree
Objectives analysis	1. Create an objectives tree by reformulating the problem tree to show positive, desired conditions 2. Review the means–ends relationships for validity and completeness 3. Draw lines to show means–ends relationships 4. Reach broad agreement among participants in workshop
Alternatives analysis	1. Identify various means–ends ladders 2. Eliminate undesirable or unachievable objectives 3. Discuss the implications for various stakeholders 4. Select the most feasible alternatives, using agreed-on criteria
Evaluation matrix	1. Identify long-term and immediate project objectives 2. Identify outputs to be achieved within the life of the project 3. Identify project activities and processes leading to outputs 4. Identify inputs 5. Identify which inputs and outputs to measure and which activities to monitor, using what methods and indicators
External factors	1. Identify external factors to take into account 2. Weight external factors for importance and probability 3. Assign measures and indicators for external factors
Performance indicators	1. For each objective, identify the quantitative and qualitative performance standards for specific target populations, locations, and time frames 2. Check the availability, reliability, and costs of obtaining the data 3. Design the data-collection component of the evaluation

3. Indicators in Telecentre Studies

Indicators are at the heart of any evaluation, and it requires considerable effort to first identify them, then refine them, and, ultimately, agree on them. Indicators for assessing telecentres are a common thread linking the methodology of telecentre evaluations across various parts of Africa. Having common indicators for telecentre assessment is the key to comparative research in the Acacia Initiative.

Indicators are measuring devices. They define concepts, such as *telecentre user* or *improved emergency response* in terms of the measurements and data it is possible to collect and analyze. They define what data to collect and at what time intervals. For example, is *telecentre user* to be defined as "anyone who has used the telecentre once"? What about classification into users, regular users, and frequent users? How will these categories be defined? Is frequency of use the only relevant measure, or should the evaluators have some component that measures the length of the average visit and indicates the activity undertaken during each visit? For example, one study divided users into those who used the telecentre as a workplace, regular users, and occasional users. Can evaluators use definitions across different national programs, or does the concept need to be locally defined? There is no necessary right or wrong answer: the key is to select indicators that meet the objectives of the study and fulfill certain general criteria for indicators.

Although the development of indicators for telecentre evaluations is still at an early stage and the indicators are context specific, there is reason to hope for consensus on common core indicators that can be used to frame data collection for telecentre pilot projects in Africa and elsewhere. Key criteria in the Acacia Initiative are local relevance and reliability, together with robustness when used for comparison of one project or country with another. The indicators suggested in these guidelines are first-generation indicators for telecentres. Some were borrowed from other evaluation studies with similar goals and research hypotheses, and others were developed from Acacia research projects and applied in the baseline studies. After the telecentre studies have been implemented and their findings have been analyzed, the indicators will be refined and better grounded in a body of research results.

3.1 Developing indicators for telecentre projects

The evaluation team will establish indicators during the evaluation-framework planning process. To have good indicators, you need a clear vision of what you are trying to achieve and what you are trying to measure. Therefore, the first requirement for the systematic development of indicators is to have identified the results, objectives, outputs, and any key concepts associated with the project as part of the evaluation-system plan. The basic approach to creating indicators involves four steps:

- Identify what is to be measured;
- Develop trial measures;
- Assess each trial indicator, using agreed-on criteria; and
- Select the best indicators for a specific project (Table 4).

Developing indicators requires a good measure of common sense

Developing indicators involves several trade-offs. For example, it is not always better to have a lot of indicators; each indicator has a cost in terms of collecting data, as anyone who has designed (and eventually shortened) a questionnaire will attest, and the added value of each indicator will have to be assessed against the costs of obtaining the data. Some indicators may require data that cannot be reliably or consistently collected over time. Some data may require reinterviewing of the same respondent, but the sampling strategy fails to ensure that the same people are resurveyed.

It is important to recall that all indicators are based on assumptions about what is relevant, and indicators are therefore expressions of value to some extent. This is one reason why evaluators should discuss indicators with various key stakeholders before using the indicators, both to get the stakeholders' views and perceptions and to ensure that the data will respond to their information needs. If a ministry needs to know how the area serviced by a telecentre changes over time or whether the telecentre is reducing youth unemployment, the evaluation needs to include some indicators of these changes to make it useful to this stakeholder.

Table 4. Steps in developing indicators for evaluation.

Step	Action
Step 1: Identify all concepts to be measured, especially project objectives and outputs	• Review all concepts, objectives, results, and output statements to clarify them and get agreement • Be clear about what type of change is implied (a situation, state, condition, attitude, behaviour) • Clarify whether the outcome sought is an absolute change, a relative change, or no change • Specify where and when the change is expected (what target group, what location, and in what time frame) (this identifies the appropriate unit of analysis) • Determine the relationship between project activities and their outputs or objectives (are these outputs or objectives direct or indirect?)
Step 2: Develop a list of possible (trial) indicators	• Think of possible alternative indicators for each concept, objective, and output, without being too restrictive • Conduct internal brainstorming sessions • Consult stakeholders and other experts • Try to borrow from other projects and studies
Step 3: Assess each trial indicator against criteria	• Establish an agreed set of criteria for indicators (see Table 5) • Use a scoring scale (1–5) to determine the usefulness of each trial indicator (but be flexible and use your own judgment)
Step 4: Select the best indicators for this project	• Consider each indicator on its merits against the criteria • Consider the mix of indicators to construct a robust set that is consistent and complementary in terms of data-collection methods and time frames • Avoid having too many indicators (it may indicate that the objectives and outputs are not clearly defined) • Be prepared to update your indicators — the best indicators may change as projects develop (one common change occurs after using input indicators at first and then realizing that output indicators were what was needed)

Source: Based on USAID (1996).

Accounting for the competing needs of diverse stakeholders is also an important part of the trade-off process, and their involvement in this process will make it clearer to them.

What changes are foreseen?

In practice, it can be quite difficult to know exactly what type of change to anticipate and therefore to measure. But it is not worth glossing over ambiguities at the design stage, as they will only come back to haunt the evaluation study later on, which can incur costs in time, usefulness, and credibility. What change is anticipated or planned? A telecentre-impact evaluation may include changes in a state

Table 5. Criteria for assessing indicators.

Criterion	Description
Direct measure	• Indicator is intuitively understood (high face validity) • Indicator is a direct measurement, rather than a proxy that depends on assumptions for its validity • Indicator is supported by a body of research
Objective	• Indicator is unambiguous about what is being measured • Different people will collect comparable data based on the indicator • Definition remains stable over time, so change can be measured • Indicator is unidimensional (measures only one thing at a time) • Indicator can be quantitative or qualitative, as long as it is clearly and consistently defined and interpreted
Adequate	• Either by itself or with a minimal companion set of indicators, the indicator provides reasonable confidence that it accurately measures the attribute • Object is to have as few indicators as possible per attribute (should be three or fewer) — more is not necessarily better • Number of indicators will depend on the complexity of the object, or what is being measured
Quantitative	• Quantitative indicators are more objective than qualitative ones • Qualitative indicators should be adequately specified to be objective and consistent
Disaggregated	• The more disaggregated the indicator, the more easily data can be manipulated to answer questions not anticipated at the outset
Practical	• Data can be collected at reasonable cost, given their utility • Data are available and can be collected at suitable time intervals • Data can be readily collected in various projects for comparison
Reliable	• Indicator is reliable within the context of the evaluation purpose and resources • Data-collection process is consistent across different time and space scales, using comparable methods and sampling procedures • Indicator is based on representative data

Source: Based on USAID (1996).

or condition (as in family income), an attitude (as in more interest in consumer goods), knowledge (as in learning a new language or new skills), and behaviour (as in using innovative farming methods). You should classify the changes according to whether they are absolute (something new), relative (changes in some already existing situation that increase, decrease, improve, or worsen it), or no change (maintenance of the status quo). You should also specify the indicators as clearly as possible to the relevant group (such as community members, farmers, women farmers, women farmers who are regular users of the telecentre).

Tables 4 and 5 are based on the recommendations of the Center for Development Information and Evaluation, an institute of the United States Agency for International Development (USAID). But these tables also reflect the experience and advice of many texts on how to develop indicators. Table 5 summarizes the criteria usually applied in assessing potential indicators. They are common-sense criteria and should be used flexibly. For example, direct measures are not always better than indirect measures, and quantitative measures are not always better than qualitative measures. The process of developing indicators is a combination of brainstorming, borrowing ideas from others, multistakeholder discussions, and being clear about definitions, criteria, goals, and priorities and very parsimonious about the number of indicators. In short, more work and hard decisions at this stage will later reap rewards in a more focused and cost-effective evaluation.

The proposed indicators fall under four main categories, each with several subcategories:

- Telecentre performance indicators
  - Basic telecentre parameters
  - Demand for services
  - Service performance
  - User behaviour and perceptions

- Sustainability indicators
  - Financial sustainability
  - Policy and regulatory environment
  - Human-resource sustainability

- Content indicators
  - Content demand
  - Information online
  - Sector-specific information

- Impact indicators
  - Economic impacts
  - Social impacts
  - Impacts on organizations

Table 6. Basic parameters for background information on telecentres (excluding financial data).

Main categories	Parameter	Alternatives or qualifiers
Location and access	Geographic location	Of community
	Type of community	Use appropriate categories
	Location within community	With respect to population, travel time, location of other institutions, services
	Host institution	School, library, business, mobile unit, stand-alone, etc.
	Hours available to public	By weekdays, weekends
Origin, ownership, and management	Origin of telecentre	Initiated by outside donor, public program, community organization, private enterprise
	Ownership	• Public, private, franchise • National agency, community, institution, individual
	Management	[Same as for ownership]
Facilities and equipment	Building	• Area provided, rooms, spaces • Utilities, telecommunications • Security, other facilities (waiting area, meeting rooms, toilets, cafeteria, etc.)
	Equipment	Telephones, photocopier, fax, computers, modem, Internet connections, radio, television, VCR, typewriter, printer, scanner, audiovisual aids
	Software	Word processing, desktop publishing; spreadsheets; databases; graphics, communications, antivirus, drawing and sign-making software; educational typing tutors; literacy, numeracy, language, simulation, recreational programs, reference libraries
Services	Telecommunications	Telephones, fax, Internet access, e-mail, subscription services, voice mail
	Business services	Photocopying; word processing; spreadsheet, database services, typing services; printing; electronic commerce
	Job search	Job preparation, résumé writing, job searches, placement, advice
	Education	Distant learning, adult education, homework or student support, training classes, typing tutors
	Culture, recreation	Cultural events, recreational software

(continued)

Table 6 (concluded).

Main categories	Parameter	Alternatives or qualifiers
Staff	Numbers of staff	• Full-time, part-time staff, volunteers • By gender, age, community
	Qualifications	Formal education, technical ICT expertise; financial, administrative, marketing, fund-raising, special, interpersonal, local-language skills
	Employment and reporting relationship	• Employed by, reporting to whom • On salary, commission • Paid by the hour, flat rate

Note: ICT, information and communication technology; VCR, videocassette recorder.

Don't try to do everything

The lists of indicators in these guidelines are checklists, intended only to start the ball rolling. They are not definitive, and they include indicators that are clearly alternatives. Aiming to include all the indicators on any list would almost certainly not be cost-effective. The first list (Table 6) is perhaps the only one where it is recommended that most, if not all, of the parameters be collected. These are also, as mentioned, first-generation lists, to be built on and improved with more research experience on telecentres. It is hoped they will help collaborating scientists identify a common set of indicators to make up the core of regional and international comparisons.

3.2 Telecentre performance indicators[3]

Telecentre performance has two important yardsticks:

- The telecentre's own goals and performance targets, as set out in its business plan, mission statement, or program-proposal documents; and

[3] *Performance indicators* often refers more generally to how well a project is achieving its various objectives: this allows comparison of project performance with the targets and goals set out for it. For example, project performance indicators could be established to measure the extent to which a telecentre is helping to diversify markets for local entrepreneurs or providing particular information to women on child nutrition. These indicators are treated under "Impact indicators" (section 3.5) and "Content-demand indicators" (section 3.4.1), respectively. *Telecentre performance indicators* here refers more narrowly to the provision of services within the telecentre and the performance of the telecentre staff and equipment in providing those services. These have been treated separately, as they are a specific area of concern to telecentre programs in Africa, where telecommunication and other infrastructure are less available and reliable.

- The satisfaction of the needs of its users.

The value of having common core indicators is that the researcher can objectively compare one telecentre's performance (or one national program) with another in a cross-sectional analysis and reliably measure changes in the performance of individual telecentres or national programs over time. As noted earlier, the proposed telecentre performance indicators are grouped into basic telecentre parameters, demand for services, service performance, and user behaviour and perceptions.

3.2.1 Basic telecentre parameters

A number of qualitative and quantitative parameters together describe a telecentre: its location; origin, ownership, and management; facilities and equipment; services; and staff (see Table 6). Also important are its funding sources and means of generating revenue (discussed in section 3.3.1). The parameters proposed here constitute the recommended core description needed to compare various telecentres and establish a baseline to measure future changes. Additional information should be collected for particular telecentres and contexts. Evaluators should collect data for some indicators several times to measure changes in the telecentre. For instance, the start-up phase (usually the first year) is generally very different from subsequent years of operation. Telecentre services tend to expand, especially in business-support activities, and public funding and grants usually decline or end after the initial 1- to 3-year start-up phase.

These parameters can also provide information on what are often assumed to be success factors for telecentres, such as degree of community involvement in establishing and running a telecentre. Community involvement is measured in terms of the community's role in the origin of the telecentre, its ownership and management, the community's satisfaction with its performance (see Table 10), and basic community characteristics (see Table 6). In contrast, telecentres relying on international-donor initiatives or public programs, rather than the community or local entrepreneurship, are less likely to be financially sustainable after the initial funding runs out (ITU 1998).

Experience with telecentres in developed countries has underscored the importance of having well-trained and well-motivated staff to provide technical expertise, friendly support, and entrepreneurship. You can measure the contribution of human resources to successful telecentre operation, using both indicators of user satisfaction and objective measures such as hours of operation, location of

Table 7. Indicators of demand for telecentre services.

Area	Potential indicators
Community characteristics	• Total population, population density, walking distance to telecentre • Family, per capita income • Economic activities • Literacy rate, highest education level (by gender, age, ethnicity) • Percentage of families with migrant-worker members outside community • Numbers of organized community groups, of their members • Number of telephones per 100 people • Other infrastructure available • Other services, institutions organized at community level • Presence of community leadership supportive of telecentre • Awareness of telecentre services
Current ICT services	• Current availability of service (telephone, fax, e-mail, etc.) • Distance traveled, time taken to meet current needs • Frequency of service sought or used (telephone, fax, Internet, etc.) • Cost of existing services per use • Reliability of existing services • Main purposes for use of existing services (business, personal, etc.) • Likely impact of telecentre on existing service suppliers
Expressed need	• Percentage of population expressing a need for specified telecentre services • Willingness to pay for services per use as a percentage of per capita income • Percentage willing to become involved in telecentre start-up or operations • Expressed demand for each specific telecentre service
Applications	• Specific applications needed (by gender, age, group)? • Availability of trained and skilled information brokers

Note: ICT, information and communication technology.

the facility (including the nature of the host institution), and who employs and pays the staff. Experience with other technologies introduced into rural Africa has shown that these kind of variables also affect how the community accesses and uses a facility. The bottom line is that basic data should be collected on the physical facilities, quality of human resources, and the ways they combine to provide services for users.

3.2.2 Demand for services

Measures of demand for telecentre services (Table 7) should be included in a baseline community survey and, preferably, in any feasibility study undertaken for

the telecentre project. The indicators will also measure changes in demand for services as the telecentre becomes established and better known.

3.2.3 Service performance

Telecentre performance depends on a combination of equipment and human performance, given the reasonable quality and reliability of the power source, telecommunication infrastructure, and financial structure. Many of the indicators shown in Table 8 combine these components in terms of the user's experience of the service. The telecentre manager will need to work back from these indicators to identify the source of any problem in service delivery. Sometimes the cause will be equipment malfunction or breaks in power supply or telecommunication

Table 8. Indicators of service performance.

Potential indicator	Qualifiers
Percentage of time telecentre service is interrupted	Electricity supply, phone service down
Percentage of time each unit of equipment is working	Time measured in hours the telecentre is open to public per week
Percentage of successful attempts to use equipment	Include all user attempts during measured period
Percentage of successful attempts by each user	By gender, age, relevant user group
Causes of intermittent equipment failure	Percentage of failures caused by equipment malfunction, break in the power supply, connectivity
Human-associated equipment failure	Staff technical, administrative competence, user behaviour, error, inadequate help-desk support
Number of events involving a major risk to equipment or telecentre infrastructure	Through theft, vandalism, accidents, natural disasters
Number of people served by each unit of equipment, by telecentre	Number of users, user visits, user attempts, total population served
Percentage of visits occurring when telecentre was open and operational (sometimes telecentres are open but equipment is down)	By gender, age, relevant user group
Percentage of successful requests for staff help	By gender, age, relevant user group

connectivity. Sometimes a major downtime will result from theft or vandalism, which leads back to the issues of security and risk management in protecting equipment, software, and people. Security is a major issue for telecentres, where expensive equipment is involved; theft has already been reported in the Acacia pilot projects (Khumalo 1998).

Service performance is also related to how the telecentre is managed and staffed. Telecentre staff play a key role in providing user-friendly technical support; ensuring good administration, risk management, and security of equipment; and educating people to adopt appropriate user behaviour (no food or drink near computers, no personal disks or software that may contain viruses, no fighting or running, etc.).

Service performance is also related to telecentre design and the type and quality of equipment and maintenance contracts purchased to meet the anticipated demand for services. One basic parameter critical to equipment performance is the total population (or number of users) a telecentre is supposed to serve and the amount of time any piece of equipment is in use. Section 3.4 deals with aspects of performance related to the availability of relevant information and applications.

To measure many performance indicators, researchers require longitudinal data. Information collected on a daily basis, recorded by telecentre staff using a standardized daily log, is the most direct and accurate. The telecentre staff should, at a minimum, keep a daily "trouble log," in which they record problems with the equipment for later analysis and diagnosis. Evaluators can complement and cross-check these data by asking users how frequently they experience success or failure with the equipment. A sign-in procedure (either on screen or with paper and pencil) for users can provide these data, or the evaluators can undertake regular user surveys. Experience in developed countries strongly suggests that the evaluators should prepare summaries of these daily logs on a regular weekly or monthly basis and regularly review them with all staff to obtain feedback and elicit suggestions.

In addition to the general performance indicators shown in Table 8, other specific indicators are useful in assessing a telecentre's performance in relation to Internet use and access. Table 9 is drawn from the recommendations of the US National Research Council (NRC) on developing indicators of Internet use in Africa (NRC 1998). Some of the data needed for the indicators may be available from a phone company, whereas others may have to be collected at the telecentre.

Table 9. Indicators of Internet use and service.

Parameter	Potential indicators
Internet use	• Total traffic (kilobits per day) • Pattern of traffic (destination, daily, weekly, monthly patterns) • Changes to traffic volume, patterns • Total connect time per day • Total number of e-mails per day • Average user connect time • Average number of user connections per day • Total number of users by category of user
Internet service	• Percentage of messages failing to reach their destination • Average delivery time of e-mail messages, data transfers • Number of attempts before successfully connecting to the Internet • Call-failure rates in connecting to the web

Source: NRC (1998).

3.2.4 User behaviour and perceptions

The measures of user behaviour and perceptions cannot pretend to give a full picture of the role of the telecentre in the community; nevertheless, they are central to any evaluation of telecentres, and the user surveys you need for these measures are likely to be cost-effective. As well, the evaluators can conduct these surveys at the telecentre, where the respondents are likely to have an interest in the telecentre and be reasonably knowledgeable about it. Furthermore, such surveys can provide longitudinal data if each user receives an identity code and answers a short survey on each visit. The evaluators may find it is worth having a panel of users to form a longitudinal sample, in addition to conducting random sampling or establishing user login procedures. A longitudinal sample will provide a measure of change over time in a number of variables, such as telecentre-service use, frequency and length of visits, payments per visit, and changes in satisfaction and perceived benefits.

From telecentre users can be obtained two broad types of indicators:

- Reports on behaviour (what services were used on each visit, for what purposes, etc.); and

- Subjective measures of telecentre services and their benefits (Table 10).

Table 10. Indicators of user behaviour and perceptions.

Area	Potential indicators
Telecentre use per visit	• Telecentre services used • Purposes of use of services • Applications used via Internet • Service for self, other person, or organization (relationship to self) • Total services used in each visit • Services sought but unavailable • Length of telecentre visit • Time, cost of journey to reach telecentre • Time, day of visit • Payment made for each service and total payment
Telecentre use (longitudinal data)	• Frequency of visits • Change in schedule (time, day) • Change in pattern of service use • Change in time spent and payment made • Change in demand for other services • Change in applications used
Satisfaction	• With each service provided • With telecentre services, facilities • With cost in time, money • With telecentre, staff support
Perceptions	• Of benefits, drawbacks, impacts to self, family, organization • Of benefits, drawbacks, impacts to community • Of inequitable distribution of benefits • Of alternative services to meet needs • Of willingness to pay for services • Of how telecentre can be improved

Because these indicators should be susceptible to analysis by individual and group characteristics (age, gender, educational level, occupation, membership in organizations, etc.), evaluators should collect basic data on the respondents when they first agree to take part in the survey and should compare data from user surveys with those the telecentre staff collect on performance. User-survey data will provide both cross-checks and information from various stakeholder perspectives. Collecting data from users while they are at the telecentre increases the accuracy of the survey and takes advantage of the fact that the users share the evaluators' goal in gathering information to improve the service.

3.3 Indicators of sustainability

The sustainability of telecentres is of considerable interest to everyone involved in the centres, especially if the telecentres receive assistance during the start-up phase in the form of reduced tariffs, special investments in equipment and infrastructure, or international-donor assistance. The big question is whether the telecentre will be financially feasible once the special grants end, the equipment needs to be replaced or upgraded, or the telecentre has to compete on a commercial basis (or at least run on less public funding). A number of telecentres have been established in Africa without the minimum level of income and infrastructure to ensure their financial success, and there is concern that these telecentres will fail, like other development projects before them, and bring the experience of failure to the communities as well.

The question of sustainability also arises for private-sector telecentres, although they usually have a smaller gap between start-up and operating costs and revenues, as they tend to take a more incremental approach (starting as a phone kiosk) and build up as demand and revenues allow.

The Universal Service Agency of South Africa (USASA) is the statutory body responsible for promoting universal access to telecommunications in South Africa. USASA asks prospective franchisees two questions about sustainability:

1. What ideas do you have for making a telecentre feasible and sustainable so that it can generate its own funds, maintain contracts, or receive external funding?

2. How will you ensure that the telecentre remains socially sustainable so that it continues to be relevant and used by the community?

These questions, together with the wider issue of a supportive policy and regulatory environment for the telecentres, define the key indicators of sustainability.

3.3.1 Financial sustainability

The basic indicator of financial sustainability is the situation where the revenues of a telecentre (including grants, in-kind support, and cash earnings) are greater than the expenditures and this happy situation is projected to continue for at least 3 years. However, this accountant's view of financial sustainability is complicated by the fact that the community telecentres are a mix of public good and private

service, and this mix is generally reflected in the funding structure. Most telecentres receive some public funding, at least during the start-up phase, although many commercial phone–fax shops and cybercafés in Africa operate without direct public support, particularly in densely populated urban and peri-urban areas.

The situation is further complicated by the special tariffs, grants, and regulatory arrangements made to support telecentres in their initial phases, especially in areas where they are unlikely to survive on their own earnings. The financial sustainability of a telecentre therefore depends on a number of intersecting factors related to the telecentre's own budget, its local catchment area of users, and the wider policy and technology environments. However, in practice, telecentres may be seen as financially viable if they cover their operating costs.

The telecentre will have significant start-up costs in building or converting a suitable structure to house the equipment, in putting in suitable power and telecommunication supplies, and in equipping the telecentre. For a number of the pilot telecentres supported by the Acacia Initiative and its partners, public funding or international-donor support fully or partially meets these initial costs. In some projects, moreover, the government is waiving the normal criteria for installing telecommunication links (in terms of population, gross national product [GNP], or economic activity). Although these subsidies get the telecentres started, they do not ensure their financial sustainability in the longer term. Several of these pilot projects may, in fact, have a hard time achieving sustainability once the subsidies and grants end. In general, the budget for the start-up phase will be different from the budgets for later operational years, and, in some cases, the initial budget is not a good predictor of longer term sustainability.

Table 11 outlines the principle items in a telecentre budget that need to be taken into account in assessing a telecentre's financial risk. Experience from telecentres in various parts of the world shows that the most commonly underestimated costs are those related to staff training, security (both physical and data security), and the updating and maintenance of equipment, especially computers. Uncertainties are built into the expenditures, especially communication costs. The telecommunication supplier establishes these costs, and the costs can change suddenly with a change in government policy. A preliminary evaluation of USASA's experience in South Africa (Khumalo 1998) showed that one of the major problems was in the prices charged for telecentre services. USASA does not fix tariffs or prices, and the study concluded that the pricing structure varied between telecentres: prices could be well below or well above the actual costs. This clearly jeopardizes financial sustainability, directly and in terms of future user satisfaction.

Table 11. Schematic telecentre budget.

	Budget item
Expenditures	
Start-up costs	• Site and building (purchase cost, conversion) • Installing power supply, telecommunications • Installing security equipment • Equipment and furniture costs (purchase, down payment) • Software, supplies, reference, training manuals • Training costs
Operating costs	• Site and building (rent, maintenance) • Insurance, security operating costs • Equipment, furniture (lease, amortization costs over time, maintenance costs) • Upgrades to equipment and software • Communication costs (fees fixed, per use) • Staff costs (salaries, benefits) • Training costs • Outreach, promotion
Revenues	• Grants • Public subsidies • Private donations, fund-raising events • In-kind support (e.g., equipment, volunteers) • Community support (e.g., rent-free building) • Membership fees • Revenues earned from core business: · Connectivity (phone, fax, Internet, web pages) · Direct computer access to users · Office services (photocopying, scanning, audiovisual aids) • Revenues earned from ancillary activities: · Business services (word-processing, spreadsheets, budget preparation, printing, reception services) · Educational services (distant education, training courses) · Community services (meeting rooms, social events, local information, remittances from migrant workers) · Telework and consulting · Specialized activities (telemedicine) · Sales (stationery, stamps, refreshments, etc.)

On the revenue side, important considerations are how long the initial grants or public subsidies will continue and whether other sources of revenue will replace this often major initial funding. You can see in Table 11 a distinction drawn between revenues earned from the core business of the telecentre (which is not fixed but generally relates to connectivity services and the provision of computers and software) and those earned from ancillary activities. Often, the core business is unsustainable by itself — over time, successful telecentres increase the number and volume of their ancillary activities. Activities such as educational and

business services depend more on there being qualified staff in the telecentre to complete a task than on simply giving the users access to the equipment to enable them to complete it themselves. Some telecentres in Europe provide a range of business-centre services for small and medium-sized enterprises and local organizations. These services include inputting and analyzing data, secretarial services, desk-top publishing, budget preparation, and reception. Most of these European telecentres expect that this part of their business will increase as a percentage of their revenue (ITU 1998).

The telecentre budget and business plan form the basis of only one approach to measuring financial sustainability. A number of other economic models and indicators of demand have been developed to predict the commercial feasibility of telecommunication services, based on the socioeconomic characteristics of rural and urban areas in developing countries. These indicators are also useful in evaluating telecentres. Some standard indicators of capacity to pay for telecommunications are GNP per capita, population density, penetration of electrical power in rural areas, and penetration of telephone service.

Rural areas of developing countries are generally thought to be able to pay 1–1.5% of their gross community income on telecommunication services (Kayani and Dymond 1997). In the poorest of these areas, this figure may be as high as 3% because of the lack of alternative communication services for people unwilling to make a long journey. ITU uses a figure of 5% of household income to estimate capacity to pay for telecommunication services (Ermberg 1998). In reality, these figures are rarely realized, for two main reasons: they assume that a telecentre is accessible to everyone when they need it, meaning that it is well located, is open, and is functional; and they take no account of collect calls or of incoming calls at the telecentre.

Studies in Kenya, Malawi, and Zimbabwe found 60% of the outgoing calls at rural pay phones are collect calls (DANIDA 1991). This takes no account of incoming calls, which are a common use for pay phones in rural and small-town Africa; indeed, in Mozambique, a country with a high out-migrant population, queues of people line up outside the pay phones on the weekends, waiting to receive their incoming calls. For a telecentre, this would mean providing a service and incurring fixed costs without receiving any revenue. It has been proposed that some account be taken of this phenomenon when assigning telecommunication charges to rural telecentres, as the telecentre is actually cogenerating the revenue paid out by the caller (usually in the urban areas) (Kayani and Dymond 1997). In South Africa, some telecentres charge a fee for receiving an incoming call.

The World Bank model for testing the feasibility of providing rural telecommunication service estimates average rural incomes with a formula that includes per capita gross domestic product (GDP), country purchasing-power-parity income-distribution figures, and rural population as a percentage of total population. The result (average rural income) is compared with the estimated capital cost of providing the service per line (based on population density and geographic factors) and the estimated annual revenue per line needed to cover capital costs and make a profit. The model then calculates the number of inhabitants required to support a single telephone line. As demand increases, the area of commercial feasibility also expands. This means that the ratio of marginal and unprofitable customers decreases, and a government regulator can use the model to calculate the tax and fiscal incentives needed to enable the telecommunication provider to serve marginal customers (Kayani and Dymond 1997).

Indicators based primarily on per capita income may be too conservative. A study in Botswana (CANAC Telecom 1990) estimated the demand, penetration, and revenue for an average village (1 800 population) to determine the feasibility of installing private and public phones. It concluded that the average rural revenue would be US $1 200 per line, which was below the level required for profitability. A loss of 3% on the annual revenue of the public telecommunication corporation was predicted, but 5 years later the demand from rural communities was more than twice that projected and village pay phones were earning up to 50% more than projected (US $2 700 per line). These indicator errors were due to several factors, including the difficulty predicting demand for a service not yet available and the even higher costs that pay-phone users would have to pay for the alternative, which usually involved long journeys and uncertain results. Clearly, people place a higher value on their time than one might assume.

3.3.2 Policy and regulatory environment

A supportive policy and regulatory environment can make or break the financial and social feasibility of a telecentre program. The main indicators of a supportive policy environment are the following:

- A commitment to providing telecommunication service to all parts of the country, including marginal rural areas;

- Fiscal and regulatory measures to enable telecentres to become commercially sustainable;

- Encouragement for the development of an ISP market; and
- A nondiscriminatory policy on access to Internet services.

Even though new technologies — satellite technologies and wireless phones, for example — reduce the costs of providing telecommunications, servicing the rural areas still generally costs more and produces less revenue, as costs are a function of subscriber density. A key issue for the economic feasibility of telecentres in rural areas is whether the government is so committed to ensuring universal access that it is willing to provide the necessary support to telecommunications providers. Governments can provide the providers with incentives to service unprofitable areas. In a monopoly situation, governments can, for example, establish cross-subsidies between rural and urban areas. As competition increases among providers, subsidies may be targeted to provide service to unprofitable areas. In other situations, such as in Canada, the government may impose route averaging to subsidize the effective costs of calls in unprofitable areas (Hudson 1998). Another approach, followed in Peru, is to establish a rural telecommunication development fund, to which all providers contribute a portion of their revenues. A fund like this can also attract private-sector investment and loans. Most Latin American providers are required to extend services to rural communities above a certain size as part of their licence requirements (Kayani and Dymond 1997). Similar requirements to serve less profitable rural areas are being imposed in new licence agreements in South Africa and Uganda.

Most African countries do not yet have an overall policy framework for communications, but a number of them, including Ghana, Senegal, Mozambique, South Africa, and Uganda, recognize this need and are beginning to liberalize policies. Government policy clearly impacts on access to the Internet. Some countries are still restrictive in this regard, believing that their citizens will be unduly influenced by information coming largely from the industrialized world, especially the United States. More generally, governments can be more supportive of telecommunications in general and telecentres in particular by providing various fiscal incentives and subsidies, especially to offset the cost of telephone lines and the price of local and international calls. Other measures relate to the taxes and import duties on telecommunication equipment, computers, and software (NRC 1998).

Table 12 shows possible indicators of a supportive policy and regulatory environment. Not all of these indicators are readily available in some countries,

Table 12. Indicators of a supportive policy and regulatory environment.

Parameter	Potential indicators
Policy framework	• Competitive market for telecommunications • Commitment to universal access • Open policy on access to information • Liberalization of trade (import regulations for ICTs)
Telecommunications service	• Number of telephones per 100 people in the population • Penetration of telephone service in rural areas, outside the capital and major cities [a] • Penetration of electrical power in rural areas • Implemented policy on universal access • Subsidized service in unprofitable areas (cross-subsidies, targeted subsidies, route averaging, special fund) • Competitive market for telecommunication services • Pricing policies designed to encourage rural subscribers, telecentres
Internet service	• Nondiscriminatory access to Internet service • Total number of ISPs • Total bandwidth to outside country (kilobits per second) • Total number of lines leased to customers • Total number of PoPs • Percentage of population within local calling area of PoPs
Fiscal incentives, regulations	• Market strength for personal computers, modems, other ICTs • Tariffs, duties for computers, other ICTs • Cost, waiting time for installation of a telephone line • Cost per minute to access PoPs • Cost per minute for international, national, local calls

Note: ICTs, information and communication technologies; ISP, Internet service provider; PoP, point of presence.

[a] Definitions of *rural* vary, and data may not be available for rural areas.

and others will have to be defined according to the local situation. In some cases, only national-level data are available, rather than statistics broken down by rural and urban areas.

3.3.3 Human-resource sustainability

The question of human-resource sustainability should be of concern at both the level of the individual telecentre and that of the regional or national telecentre program. Shortages of adequately trained staff and losses of trained staff and technical experts to other employers, usually in the private sector, plague public-sector telecentre and telecommunication programs. Key indicators are salaries and benefits compared with those offered by competing employers, staff turnover rates, and investments in training. Another indicator is ratio of local qualified technical staff to imported technical expertise.

Investment in training is a measure of human-resource sustainability. Some fairly easy indicators to obtain are the number of technical ICT training courses provided in local (national) institutions over time and the number of graduates or diploma students they are producing. These numbers provide some measure of the pool of qualified personnel and how it is changing over time. If the pool of qualified personnel is at or below the level needed to support the telecentre program and telecommunication and Internet services, problems can be anticipated in human-resource sustainability, as demand for such technical personnel is likely to rise rapidly and outstrip the human resources currently available or in training. Demand and supply of specialized labour are notoriously difficult to manage, especially in the high-technology sector. However, in Senegal, it is reported, many unemployed recent university graduates are attracted to the telecommunications industry and could provide technical support to community telecentres.

In South Africa, the USASA established a 5-week training program for telecentre operators, which is certified by the Wits University Faculty of Management. It covers telecentre management (planning, finances, personnel, infrastructure); basic maintenance for phone, fax, photocopier, and computer system; how to train others; entrepreneurship and fund-raising; the role of the telecentre in supporting small businesses, schools, and the community; the use of computers for communications; and applications such as word processing, spreadsheets, databases, e-mail, and web browsing.

An evaluation conducted 1 year after the program began found that telecentre operators did not clearly understand their responsibilities and obligations as franchisees and generally did not know how to manage their businesses. In particular, most of the telecentres managed their financial records inadequately, and USASA had no system in place to monitor financial performance (Khumalo 1998). It is not known how many of these operators had completed the Wits University course. But to avoid these outcomes, the Acacia telecentre project being carried out in Senegal by Environnement, développement, actions du tiers-monde (ENDA-TM, Environment, Development, Action in the Third World) emphasizes the importance of adequate training for telecentre operators. The training program includes not only applications like word processing, spreadsheets, presentations, and the creation of e-mail accounts and web pages, but also skills such as management, project evaluation, data collection and analysis, and conflict resolution.[4]

[4] ENDA-TM is an NGO based in Dakar, Senegal. It is undertaking an Acacia-funded project to develop community-based and community-run telecentres in Senegal (www.enda.sn).

Some measure of the investment in human-resource training as a proportion of overall telecentre-program costs is another indicator of human-resource sustainability, although appropriate benchmarks need to be established. A study of World Bank information-technology projects, for example, found an average of 24% of total project cost was invested in training and technical support (Hanna and Boyson 1993). In the United States, the information-technology industry spends 50–68% on training, even though the basic knowledge of incoming personnel is quite high (Norrish 1998). The investment in training for telecentre programs in Africa almost certainly should be no less than that in developed countries, but it almost certainly is. It is therefore important to examine human resources, particularly the training aspects, at both the level of the individual telecentre and the level of the national agency.

3.4 Applications and information content

> Information, in the abstract, means little to the engineer, the agriculturalist, the farmer, the craftsman, or the doctor ... . Considering information for information's sake is a dead end.
>
> — Menou (1993)

Social theories of information emphasize the importance of timing, the credibility of the source, and the relevance of the information to the receiver at the time it is received. The information available on the Internet has underscored the importance of another factor: the ability to sift through the information to find what is useful in a reasonable amount of time — in other words, the cost-effectiveness of the information search process. In the NRC model, information content is the key variable linking Internet supply and its supporting environment to impacts on organizations, markets, and sectors (NRC 1998). Telecentres have tended to focus on serving either the needs of local enterprises (and being businesses, themselves) or the community's needs, such as education, health, and culture. Thus, privately funded and owned telecentres are more likely to concentrate on business applications, whereas government- or NGO-supported telecentres are more likely to concentrate on public issues, such as community development and education. In practice, many telecentres serve both types of user, and MCTs are explicitly designed to have a dual business–public orientation.

3.4.1 Content-demand Indicators

The evaluation team will need to pay attention to the information needs of local users. Some measures of the demand for information, collected from key organizations and community leaders and the baseline community survey, will identify at least the perceived priorities for information at the outset of the telecentre project. Later, both community-wide and user surveys, asking the same questions, will provide direct measures of changing needs. It is important to pay particular attention to the applications and content that are valued by key institutions and services already in the community, such as medical facilities, schools, colleges, and government offices. The baseline survey of the main economic activities in the area will also provide data on these applications, such as price data for locally produced goods, even if the community members are not yet aware of the vast array of information resources available on the Internet or specialized networks.

Table 13 reports the results of an informal survey (Whyte 1998) of user groups in communities destined to host pilot-project telecentres in Mozambique, Senegal, South Africa, and Uganda. The survey was conducted to identify community needs in information content and communications.

Understanding the local needs for applications is thus the first step. But responding to them is a far harder and longer process and more difficult to measure. The telecentre-program managers and the individual telecentre operators are on the front line in facilitating people' access to information that is really useful to them. This is a measure of their own ability to act essentially as community development officers, or *animateurs*. The degree of emphasis on this aspect of the role of telecentre operators appears to differ among the Acacia pilot projects. For example, in the ENDA-led Acacia project in Senegal, it is a key aspect of the operator's role, and one could say that the telecentres are both content driven and firmly linked to participatory community development. The NGOs leading each telecentre have specific and distinct entry points into community development. These entry points range from education through to small-business development, traditional medicine, water and sanitation, women's development, microcredit, youth, and promotion of local culture. The lead NGO brings together all the community organizations to support the community telecentre (see the ENDA website at www.enda.sn).

Table 13. Information and communication needs expressed by communities in Mozambique, Senegal, South Africa, and Uganda.

Government
- Government regulations, legislation, procedures, "how to do it guides"
- Up-to-date information on taxes, incentives, subsidies, quotas, tax changes
- General public information on government
- Access to one-stop government electronic service

Agriculture
- Up-to-date information on markets, prices
- Data on pests, infestations, animal diseases, how to control them
- Improved (appropriate) technology for traditional crop cultivation, animal husbandry
- "How-to" information on new, more profitable, agricultural initiatives (e.g., mushroom growing, rabbit rearing, egg production for urban markets)
- Better information on improved animal breeds, veterinary information generally
- Telephone access to vets and artificial insemination services
- Communications to organize load sharing for truck transportation
- Listings of where seeds of specific qualities, quantities are available
- Listings of available spare parts for agricultural equipment
- Postharvest technology (cold storage, etc.)

Small business
- Information on prices, demand, competition in various markets
- Computerized small-business accounting systems (bookkeeping, profit, loss information)
- Inventories, stock management
- Best practices, business management, start-up
- Information on credit, small loans, revolving funds (how, where to apply)
- Opportunities for export, import procedures
- Electronic commerce

Health and environment
- AIDS, HIV information
- Information on family planning
- Health education, child care
- Information on water, sanitation, including water-related diseases
- Appropriate technology for latrines, waste management (including night soil)
- Energy technology, including biogas, solar driers
- Medicinal plants, traditional medicine, biodiversity
- Nutrition, recipes, new ways of cooking
- Telephone access to doctors, midwives, medical services
- Weather forecasts, crop infestations

Formal organizations (hospitals, schools, local government, NGOs, CBOs)
- Creating, maintaining computerized databases (patients' records, student enrollment)
- Reporting to headquarters (notifiable diseases, crime incidents, monitoring, routine requests for supplies, etc.)
- Local communications network (ambulance dispatching, linking schools, NGOs, etc.)
- How to organize communities, establish new organizations, develop group dynamics
- Emergency-response communications
- Access to drug registries, medical expert systems
- Access to general reference libraries, online information

Education
- Distance learning (especially for teachers, students, unemployed youth)
- Adult literacy
- Skills upgrading, certification
- Learning new, income-generating crafts (especially for girls)
- General self-learning, self-improvement
- Group education sessions, using audiovisual equipment

(continued)

Table 13 (concluded).

Empowerment democracy
• "Only people armed with information have the power to do things"
• "We'll get more improvements if we have the communications to ask for them"
• Access to newspapers, magazines (What is going on in the capital city, the world?)
• "Find out what our government is doing"
• "Teach young people about local cultures and traditions, instill pride in society"
Family, personal, informal sector
• Communications with absent family members, overseas migrants
• Communications with family members caring for children
• Money transfers for family, business
• Information on jobs
• Employment applications

Source: Whyte (1998).
Note: CBO, community-based organization; NGO, nongovernmental organization.

The following are some indicators of how a telecentre will perform in providing high-quality information (that is, locally useful and valued information):

- The emphasis placed by the telecentre operator or management on applications;
- Their level of knowledge of how to access that information or to link to specialized-application networks like HealthNet;
- Their ability to create and disseminate local information through local web pages or through their participation in an applications network; and
- The applications software and reference materials, such as CD-ROMs, they have collected in response to local needs.

3.4.2 Information online

Not only do individuals in developed countries have more access to information but there is more information relevant to their needs online or at the end of an automated phone system. The rapid increase in the use of the telephone and the Internet has led commercial companies, governments, and traditional information providers, such as libraries, to hurry to put their information online. The commercial use of the Internet, including banking and investing online, has exploded. Communities in developing countries express a similar demand for locally relevant

information online, whether it is daily market prices, the posting of changes in government regulations, agency-staff direct phone numbers or e-mail addresses, or research databases for Africa. According to the Tradepoint Senegal project, however, a major bottleneck is getting government departments to go online with the information necessary to make electronic trading in Senegal work.[5] The farmers and the entrepreneurs in the local chambers of commerce are so enthusiastic and ready to work online that national governments cannot respond fast enough to their demand for telecommunication services.

Indicators of the local relevance of information will need to include not only the demand but also the rate of change in supply. Supply can be tested directly by checking government, commercial, academic, and NGO websites and telephone-assistance numbers to see what information is available to users. However, the cost of calling government departments, if the right person cannot be found or the information cannot be transmitted effectively, can make the telephone ineffective as an information search tool. Similarly, a telecentre is no great help to anyone if the information sought is unavailable either on the Internet or through specialized networks (which can link Internet, e-mail, and even fax and reach almost anywhere). The evaluation team (and the telecentre management) can experiment by attempting to access a sample of key national and local institutions by telephone, fax, and Internet; repeat the experiment to test how the situation changes over time; and then compare the results of these experiments with reports from telecentre users.

3.4.3 Sectoral and local electronic networks

Another measure of the changing scene in Africa is the growth of regional and national electronic networks. These have not only provided access to the Internet by using links like Fidonet-based mail connections, radio connections, and e-mail sent to fax numbers but also created important cross-sectoral networks. For example, in Ethiopia, the Pan African Development Information System (PADIS) network, an initiative of the Economic Commission for Africa (ECA), comprises more than 1 000 sites, including research and academic institutions (14%); NGOs (33%); governments (4%); businesses (6%); and individuals (17%). The remaining 26% are international sites (1995 data). The PADIS network produces several benefits for participants in Ethiopia: communication services at much cheaper rates

[5] Tradepoint Senegal is an Acacia-funded project to make e-commerce available to small-scale entrepreneurs through decentralized access to ICTs in Senegal.

than fax, telex, or telephone; an increase in collaboration in research and research meetings; and a less hierarchical pattern of interaction among researchers (Adam 1996).

Another useful network for telecentres serving NGOs to link into is NGOnet, which was started by the Environmental Liaison Centre International (ELCI) in Nairobi. NGOnet is a coordination centre and clearinghouse for ECA-supported African environmental NGOs. To provide these NGOs with cheap access to e-mail, it set up four centres with high-speed modems, and these centres can also provide the NGOs with a local line to connect to the Internet and local support, including training. The hosts are ELCI in Nairobi, MANGO (Micro Access for Non-governmental Organizations) in Harare, ENDA in Dakar, and ENDA–Arabe in Tunis. NGOnet uses Fidonet, a low-cost, grass-roots electronic communications network that has been operating successfully since the 1980s.

Other electronic networks of importance to developing countries are Schoolnet, SatelLife, and HealthNet. SatelLife uses inexpensive store-and-forward systems to provide information on public health, medicine, and the environment. Originally, it linked medical centres in Africa with medical libraries and research centres in North America and Europe. It operates HealthNet, which is an information service connecting health-care workers around the world and offering e-mail and conferencing, as well as health-related journals and publications online. With its satellite system, HealthNet can reach any remote area if the user has a computer, a terminal node controller, and a satellite radio.

In Uganda, a sustainable and self-funded e-mail service has developed from MULKA, a locally inspired national electronic network started by Makerere University, Kampala, Uganda, and an NGO (Musisi 1996). The service is linked to a regional project, East and Southern African Network (ESANET), which is supported by IDRC and links universities in the region. ESANET seeks to identify cost-effective data-communication modalities for the research community and to enhance the capacity of governments to collect and analyze data for public-policy decision-making.

These and other networks play important roles in making relevant information and low-cost communications available in Africa. They are also examples of the kinds of locally relevant information networks that telecentre operators need to know about. How familiar a telecentre management group or operator is with these and similar networks is yet another indicator of the quality and relevance of the information provided by a telecentre. The evaluation team can also ask users,

particularly organizations, whether they are aware of such networks, whether they use them and how frequently, and whether they find their communication and information services more relevant and less time-consuming to access than searching the web.

3.5 Impact indicators

Finding measures of impacts on individuals, organizations, and the community is a key objective of most evaluation studies. Such measures relate to very important research questions for many local, national, and international stakeholders. Is the telecentre a positive force for community development? Does it benefit some people more than others? Does it act as a catalyst for other positive initiatives and innovations at the local level? Does it help people to help themselves? These questions convey the assumptions and vision of the promoters and funders of telecentre programs. Other questions are narrower and more practical. Is a telecentre is more beneficial to some economic sectors than to others? For every user who comes to the telecentre, how many others are indirect beneficiaries? Are there drawbacks to the telecentres, and who suffers as a result? What features of the telecentre are responsible for the greatest number of benefits and their most equitable distribution? How can these features be strengthened and replicated?

Who caused what?

Causality is one of the big conundrums in measuring impacts. Did the telecentre contribute to the rise in local economic productivity or the increased participation of women in local organizations? Or were these economic and social changes already occurring and did they themselves act as catalysts for locating the telecentre in that community? Clearly, economic potential, local leadership, and community initiative are factors in deciding where to locate telecentres, even for those telecentre programs in which the public-good rationale is strongest.

The best one can usually do, given that these are generally small-scale surveys and not large data sets suitable for endless statistical manipulation, is to obtain good baseline data; measure succeeding changes carefully; demonstrate a strong association between the telecentre and the economic or social change found; and apply the argument from "reasonableness" in judging the likely direction of causality. Collecting supporting data from several telecentre sites and from control communities without telecentres can considerably strengthen the case for a certain direction of causality. It is in this exercise that regional comparisons and consistency in measuring indicators will produce the greatest pay-off.

The evaluation planning process, particularly the multistakeholder discussions, will have provided the evaluation team with a large number of potential questions about impacts, and the evaluators will need to structure and prioritize these questions. One dimension to consider will be whether the impacts are expected to be immediate and short term, intermediate, or long term and how to translate these periods into a time frame for data collection. Many impacts may not appear for several years and cannot be directly measured within the time frame of the evaluation study. Unless the evaluation team makes a return visit several years later, these long-term impacts will be the most difficult to quantify.

To obtain indicators of impacts, the evaluators will have to collect data on characteristics of individual and household respondents relevant to the impact and research questions. As pointed out in section 2, it is better to collect disaggregated data on individual characteristics: disaggregated data can always be aggregated in the analysis, but aggregate data cannot be disaggregated. However, there is a trade-off between the expense and difficulty of collecting very disaggregated data and the level of aggregation to be used for the analysis. Classic examples are age and income. Although individual ages in years and incomes in dollars will produce interval data that can be manipulated, such data are difficult to collect from respondents, and the researchers usually ask for this information in terms of three to five levels (under 20 years, 20–40 years, etc.).

Except for the organizational impacts and changes to the community at large, the basic data-collection units for measuring impacts will be individuals and households. Particular attention must be paid to the choice of sampling frames to ensure that they capture adequate samples of the most relevant groups and can differentiate between them. Breakdowns such as gender, age, ethnicity, occupation, and language should be included, and perhaps also the less obvious variables, such as employment history, family-migration status, and participation in political parties or other measures of local activism. The characteristics of individuals, households, and communities suggested for the analysis of social and economic impacts are shown in Table 14.

The local context will generally define impacts on individuals, households, and communities in detail. The evaluation team can use the core set of potential impacts recommended in these guidelines as a basis for making comparisons if it measures them across projects and countries; however, the team will have to further refine the indicators in this core group to make them match local conditions and data availability.

Table 14. Characteristics of individuals, households, and communities for data analysis.

Level	Selected characteristics
Individual	• Age, gender, marital status, children • Income level • Level of education, functional literacy • Languages spoken • Occupation, employment status • Membership in community groups • Category of telecentre user
Household	• Location, quality of residence • Numbers in household (adults, children, gender, relationships) • Ratio of employed to unemployed adults • Employment status, occupation of head of household • Age, gender, marital status of head of household • Income level • Economic activity by sector • Whether a household includes one or more users of a telecentre
Community	• Population size, age, gender, ethnic distribution • Settlement type, geography, environmental setting • Environmental quality, major environmental problems • Area of settlement, surrounding lands, land ownership • Languages, culture, religion, ethnicity • Income distribution, savings, credit • Main economic activities (sectors), products • Commercial activity, businesses, trade patterns • Main institutions, organizations • Physical infrastructure, services • Distance to other services (medical, government, communications, libraries, education, markets, etc.) • Schools, other educational facilities • School enrollment, drop-out rates, completion rates • Adult literacy rate • Population growth rate, life expectancy • Mortality, morbidity rates • Disease prevalence • Water, sanitation services • Health-care programs, facilities, vaccination rates

Although in the next sections the impact indicators are broadly categorized as economic, social, or organizational, these are not watertight compartments.

3.5.1 Economic impacts

A number of statistical studies that have used longitudinal studies from many countries, including the United States, to correlate investment in telecommunications with per capita GDP or GNP have generally found causal relationships in both directions. An important characteristic of telecommunications is the tendency for each user's potential benefit to rise with the total number of users — the opposite of the "tragedy of the commons." Another is that, although both parties to a

telephone call benefit from the communication, only one pays directly for the call. The general thrust of the studies done on telecommunications in developing countries, where the relative gains in cost-effective communications are initially high, is that the projects produce not only public-good benefits but also major benefits in efficiency and productivity. These benefits include better price information; reduction of travel costs, inventory, and downtime, when equipment is broken or needs maintenance; timely delivery of products to market; and energy savings (Hudson 1998).

How does one translate these findings to the community level, if one depends largely on primary data collected by the evaluation team? Household-level data on income, savings, etc., are sometimes difficult to obtain and to cross-check. Strategies to deal with this problem include the following:

- Using key informants motivated to help the evaluation team;
- Using indirect measures of wealth accumulation (such as owning consumer goods, like a radio, television, refrigerator, or bicycle), which can also sometimes be observed directly (for example, construction of a new house);
- Asking questions related to spending patterns, rather than to savings; and
- Using available statistics where possible (for example, local market prices).

A valuable complement to a household survey is to ask a panel of representative households to record a household budget of income and expenditures, using a specially designed booklet. Households in this panel will likely become significant participants in the data-collection process and should receive special treatment according to an agreed-on protocol. This can be as simple as providing them with an analysis of their expenditure patterns (always a revealing process) or helping them identify patterns in market prices and business cycles. Clearly, the best data on impacts will come from longitudinal studies, which can measure changes from a pretelecentre baseline situation. Therefore, many of the indicators in Table 15 assume that measurements of change will be taken at various times.

Table 15. Indicators of economic impacts.

Change	Potential indicators
Income, prices	• Change in household income • Percentage household income of migrant-worker remittances • Average daily wage for unskilled labour, agricultural worker • Prices obtained for sector-specific products • Ratio of cash to subsidence crop production • Value of exports (agricultural, nonagricultural) within, outside country • Availability of credit • Changes in household budgets
Work related	• Percentage (especially youth) employed and earning wages in community • Percentage of successful job searches using telecentre • Percentage of households engaged in enterprises • Percentage of households adopting improved technology, new products • Increase in hours of service through reduced downtime, travel time (e.g., shops, mechanics, pharmacy, clinic, ambulance) • Increased number of different markets for buying, selling • Changes in occupational patterns
Wealth, property accumulation	• Growth in number, size of community businesses • Percentage of households owning specified consumer goods • Percentage of households owning a vehicle • Growth in individual, business telephone subscriptions • Percentage of households with new construction, major improvements • Percentage of households with electricity
Information search	• Time to obtain information, communications • Monetary cost to obtain information, communications • Percentage of successful trips, attempts to obtain information, communications • Time to place, receive orders for spare parts, supplies

3.5.2 Social impacts

Social indicators emphasize another measurement issue, in addition to the issues involved in measuring economic impacts: the need to define social indicators somewhere between those measuring "bottom-line" impacts, such as mortality rates (which, if the telecentre has any contribution to make, will be impossible to separate out from all the other contributing causes) and those measuring direct impacts on behaviour, such as the number of telephone calls made per household per month. Although direct impacts can probably be measured more easily, such data may not have great import at the level of social impact.

Table 16. Indicators of social impacts.

Change	Potential indicators
Social structure, status	• Number of households • Percentage of households with migrant workers outside community • Occupation of heads of household • Percentage of professional workers residing in the community • Turnover of professionals (teachers, nurses, etc.) in the community • Ratio of employed to unemployed adults, youth
Health	• Percentage of households with improved water supply • Percentage of households with improved sanitation • Child mortality rate • Main childhood diseases • Major causes of morbidity, mortality • Percentage of children regularly visiting a health clinic • Percentage of households with a member treated via telemedicine
Education	• Adult literacy rate • Highest educational level attained by head of household • Children's enrollment in school • Youth, adult enrollment in training, skills upgrading • Participation in distance-learning courses • Competence in English, French, Portuguese as second language • Competence in skills related to telecentre use (word processing, spreadsheets, simulation games)
Community action	• Number of community organizations • Active membership of community organizations • Community-action projects • Community newsletter, website, radio station • Response times for emergency services • Flyers, announcements
Behaviour	• Use of telecentre (purpose, frequency, success rate) • Use of alternatives to telecentre • Pattern of work, recreational activities • Patterns of travel to other communities, towns, capital • Domestic violence, violence toward women • Use of specialized professional services (veterinary, counselling, tax advice) • Purchases based on information from Internet, e-mail • Regular readers of newspapers, news sources online • Changes in time budgets
Knowledge, values, attitudes	• Self-assessed "local pride" • Awareness of events in the country, the world • Attitudes toward traditional culture, modernization • Locus of control (I–E scale) [a] • Reliance on telecentre services • Value placed on telecentre as community facility

[a] I–E scale, internal–external-control scale, commonly used in psychological measures.

The indicators suggested in Table 16 were drawn from many possible choices and were selected for probable data availability and relevance. They were judged relevant on the basis of the expectations of change expressed by groups in the communities visited in 1998, when the communities were looking forward to the benefits of telecentres; and on the basis of the major research questions for telecentre pilot projects (see section 2.1).

Some of these indicators are directly measurable; others are subjective indicators of attitudes and values. Subjective indicators are best measured indirectly on simple Likert scales, which the evaluators should pretest in focus groups or a small sample before undertaking the main surveys (see section 5). Again, not all these social-impact indicators will be useful in any one evaluation, and all will need to be defined more precisely in the local context. The evaluators should ask a panel of households or individuals to keep time-budget diaries. These will provide a wealth of information on changing social behaviour and patterns and can be rewarding for those who agree to keep them. Schoolchildren may be encouraged to keep time diaries as a school project. Others willing participants may be the members or leaders of local organizations who, with appropriate explanation, will understand the purpose and value of collecting these data.

3.5.3 Organizational impacts

Although many of the indicators already proposed for individuals and households can be used to measure changes in organizations, the importance of organizations to the development and life of the community and to the analysis of telecentres suggests that they should be accorded special attention in the evaluation. Therefore, a list of indicators of impacts on organizations is provided in Table 17. Formal organizations that are important to communities include institutions such as schools, chambers of commerce, and health clinics; businesses with at least one hired employee; and community organizations, NGOs, and committees with some formal structure and mandate. These all have some defined division of responsibilities, more or less explicit goals and objectives, and some hierarchy, usually.

In practical terms, data on organizations can be obtained from formal records and people who can speak for the organizations. Usually, a telecentre will have a school, NGO, or library as a host organization, and most will have community committees associated with them.

Information and communication are critical to the success of any formal organization. Consequently, savings in time and money, together with better performance and reliability, are key issues for the evaluation. Like the indicators for

Table 17. Indicators of impacts on organizations.

Change	Potential indicators
Operations	• Use of databases, spreadsheets for financial, other administrative tasks • Quality, timeliness of formal reporting • Response time to fulfill requests, emergency response • Use of registries, online expertise to carry out functions • Use of off-site computer capacity to do work • Use of reference libraries, downloaded software to improve performance
Networks	• Networking within larger associations of member organizations • Sharing information with other similar organizations • Number of electronic networks of which the organization is a member • Time, number of interactive discussion groups
Organization	• Number, percentage of staff using telecentre, Internet • Number, percentage of staff trained to use ICTs • Implementation of the organization's own information strategy • Growth in activities, membership • Ability to attract good leadership
Budget	• Cost savings for information, communication functions • Staff time savings for information, communication functions • Investment in purchasing, leasing ICT equipment • Change in revenue, expenditures
Perceived benefits, costs	• Change in performance indicators • Improved organizational structure, membership, leadership • Dependence on telecentre to perform tasks • Better networking • Reported success stories • Difficulties in keeping trained staff • Financial costs
Outreach	• Own website • Number of requests, hits on website • Production of electronic, print newsletters, bulletins • Number of subscribers to newsletters, bulletins • Percentage of outreach made available through fax, Internet, e-mail

Note: ICTs, information and communication technologies.

individuals and households, those for organizations can also be direct measures of telecentre use and impacts and of how spokespersons perceive their costs and benefits. The impacts will relate to the efficiency of the organization, the outcomes it achieves, its decision-making processes and the decisions it makes, and the effectiveness of its networking and information sources in reaching its goals. As noted in section 3.4.3 ("Sectoral and local electronic networks"), formal organizations at the community level are already involved in electronic networking.

4. Issues in Sampling and Surveying

4.1 Guiding principles for data collection in the Acacia Initiative

Four main principles guide data collection in the Acacia Initiative. They stem from the goals and structure of the initiative but are also useful objectives for telecentre projects other than those funded by IDRC and its partners. These main principles are as follows:

- *The information needs of the various telecentre stakeholders should be built into the data-collection design* — These stakeholders are likely to include leaders and institutions at the community level, telecentre owners and operators, private-sector investors, national agencies responsible for telecommunications, and international agencies and donors (see Table 2).

- *Learning opportunities for stakeholders should be part of the data-collection design* — An important way to strengthen learning is to have the stakeholders participate in the data-collection and data-interpretation processes. At the community level, the researchers should use participatory research methods and, at all levels, have an effective stakeholder information process to inform the stakeholders of the results and provide them with opportunities to discuss the significance of the results and have input into the design of future rounds of data collection.

- *Approaches should facilitate comparisons of results across telecentre projects and between countries* — Two objectives of the Acacia Initiative are to better understand the interplay between local telecentre operations and national policies (vertical links) and to identify the determinants of success across telecentres in different situations with different operational histories (cross-sectional comparisons). These comparisons can only be valid if the data collected from one telecentre project are

reasonably consistent with those collected from all the others. Without consistency in the definition and selection of samples and in the methods and instruments used to collect data, researchers will have little chance of making meaningful comparisons between pilot countries.

- *Data sets should be stored in a common database or data repository* — The current Acacia telecentre projects will collect baseline data on the pretelecentre situation or in the initial year of telecentre operations, or both. Some projects are designed to collect data to measure changes and impacts within the first 1–3 years of telecentre operations. These data sets have significant value beyond the objectives of the individual projects and should be properly maintained within a common facility so that researchers can use them to answer new and different questions that emerge in the future. Baseline data are also critical to any future longitudinal studies on telecentres and their communities. Consideration of the unanticipated data needs of various stakeholders, including future stakeholders, underscores the importance of such a shared database for African telecentres.

A number of practical implications for data collection flow from these four guiding principles. Although they will be discussed under the various research methods in section 5, they are worth highlighting here:

- *Data disaggregation* — If data are to be combined and reanalyzed in various ways, it is important that they be disaggregated as much as possible when collected and initially recorded. This provides for maximum flexibility in future analysis.

- *Multiple methods* — As we shall see, each method has strengths and limitations, and the variety of information needs of the telecentre stakeholders at various levels is a strong reason for using several methods with each pilot project, rather than relying on any single approach.

- *Multiple samples* — A similar practical consideration favours the use of several sample groups in the telecentre studies: telecentre users provide the most direct and relevant information on telecentre performance, but they will be unable to provide adequate data on the impacts on the

community or indicate whether the telecentre is responding to community needs. It will be advisable and probably more cost-effective to have different research instruments for different sample groups. Telecentre operators, for example, can most efficiently monitor certain aspects of use patterns and equipment performance within the telecentre environment, and it would be more costly and less accurate to try to collect these data through a community household survey. However, a telecentre operator would be unsuitable for monitoring the attitudes of non-users or the social and economic impacts on families or organizations.

- *Data-collection methods appropriate to data needs* — As will be seen in section 5, different methods are most useful and effective for different types of data, and the type of data needed should determine the selection of methods.

- *Degree of intervention and local participation* — Some telecentre-project evaluations are more "external" than others, both in terms of who is undertaking the evaluation and in terms of the role that the evaluation itself is expected to play in community change and development. The active role of the data-collection process as a change agent and the degree to which community members will be collecting the data on their own community will be considerations in selecting the most appropriate method for collecting data.

- *Methods appropriate to the level of training of the field researchers* — Some methods, such as group techniques (including focus groups and Delphi surveys [see section 5.6]) and advanced question techniques (including some attitude surveys or personality tests) require more training and experience than straightforward observation schedules or structured questionnaires do. Ethnographic studies require considerable training and commitment. The methods selected should take into consideration the qualifications and training of the field staff who will be the primary data collectors.

- *Time and cost implications of data-collection methods* — This is perhaps the most obvious of the practical issues of data collection, but it is worth underscoring because almost all data-collection exercises and

evaluation studies lack the resources they need or would ideally have. It is particularly important for the Acacia Initiative to keep such costs in mind if future follow-up data collection is anticipated, as the cost of replicating a survey or case study can become an impediment to obtaining valuable longitudinal data.

4.2 Issues related to sampling

This section suggests a number of sampling issues to consider in designing an evaluation study and thus points to some of the strengths and weaknesses of various types of samples for telecentre surveys. It is not intended as a primer on sampling strategies, which is a complex subject. For this, the reader should explore some of the suggested reading in the bibliography.

4.2.1 Sampling frame

The sampling frame is a major determinant of the extent to which a sample is representative of the population under study. A frame is perfect "if every element appears on the list separately, once, only once and nothing else appears on the list" (Kish 1965, p. 53). Sampling frames are of two general types: lists, such as electoral registers or the membership of an organization; and sets of locations on maps (such as townships or rural communities). In most cases, the sampling frame is imperfect: it has missing elements, inappropriate listings, or duplications. Kish (1965) provided a good technical discussion of frame problems.

Researchers conducting the Acacia telecentre studies may have no up-to-date or accurate lists of community members or households for designing a household sample of the community. The best frames available may be lists of school students, utility customers, and members of local organizations. However, each of these lists will have built-in biases or missing elements that may be significant enough to make it unsuitable for sampling the community as a whole.

If no adequate map is available to show locations of houses, the researchers may have to make their own sketch map or see if there are any airphotos that they can use as the basis for one (with field checking to update it).

An accurate sampling frame for use at the community level is probably the most difficult to obtain. It will be easier to sample telecentre users if the telecentre keeps a record of all users, because this becomes the sampling frame. The key issue here for researchers is to know how to recognize errors in the sampling frame they use and to seek to compensate for them, such as by using disproportionate sampling fractions or screening (see below).

4.2.2 Unit of analysis

The key to defining the unit of analysis is to find the locus of decision-making for the behaviour under study. Who makes the decision to use a phone or seek a job with an updated résumé prepared at the telecentre? Is the decision made by the individual user, the household, or an organization? And who pays for the telecentre service: the individual user, the household, or the organization? Clearly, it depends on circumstances.

Do some aspects of telecentres operate at the group level, having impacts on community identity or local innovation, for example? The appropriate unit of analysis is not always the same for every aspect of telecentre behaviour, although in practice the survey will have a uniform unit of analysis, usually an individual or a household. In some situations, however, researchers may find it more appropriate to use a local organization as the unit of analysis.

Another approach to selecting the unit of analysis is to take an event, such as a visit to the telecentre, and analyze the visitors or users and what they do during each visit. This is clearly useful for analyzing the performance of the telecentre and its financial sustainability. The key questions in this case will concern the characteristics of the visits: services used, time spent, revenues gained; and the characteristics of the individuals: satisfaction with service, new or repeat user, etc.

4.2.3 Types of sample

In an ideal world, most studies would aim to obtain **probability samples**, in which every element (person, household, or event) has a known, nonzero probability of being selected. And most statistical inferences about means and variances and regression coefficients are based on the assumption that the sample is a simple random sample. However, many studies — probably most of those undertaken in African communities — do not obtain probability samples. Of necessity and practicality, they adopt another strategy to achieve acceptable accuracy at an acceptable cost. Researchers have a number of alternatives to probability samples, and these can also be part of a good research design.

One common strategy is to use **judgment samples** in selecting the first and second stages of a stratified sample, such as communities and sections of communities, and organizations within the community. This procedure has considerable validity. As Kish, the "guru" of survey sampling, said,

> If a research project must be confined to a single city ... I would rather use my judgement to choose a "typical" city than select one at random.

> Even for a sample of ten cities ... I would rather trust my knowledge. But I would raise the question of enlarging the sample to 30 to 100 cities. For a sample of that size a probability selection should be designed and controlled with stratification.
>
> — Kish (1965, p. 29)

Quota sampling is another approach used when probability sampling is impossible or its cost is too high (several Acacia telecentre evaluations have already used quota sampling). In quota sampling, the number of individuals or households in a set of subclasses is estimated, and field investigators are assigned a quota of interviews or observations to make using controls such as geographic location, age, gender, or group membership. The controls should be manageable by the field worker who has to fill the quota.

Severe problems with bias can occur in quota sampling, both in the selection of the controls (they may not be the relevant ones) and in the freedom given to field workers to select the sample. The more freedom the field worker has, the more likely it is to cut survey costs but also to introduce bias. One type of bias — stemming from the tendency of interviewers to select, within quotas, people who are all similar — can lead to an underestimate of the variability within a population. For example, the interviewers may be asked to select a quota of people in a group of low economic status. Although the group of people selected for the sample may be expected to be representative of the whole group, the interviewers' tendency to select similar people may lead them to undersample some segments.

Knowing a sample carries a risk of bias is not the same as knowing it has, in fact, a bias. You can, in particular cases, obtain enough information to test for bias, but quota samples are difficult to compare with probability samples, because one usually has no means to test the reliability of a quota sample. Nevertheless, despite the problems inherent in using quotas, it is sometimes better to have a quota sample than, for example, no sample or a sample obtained at an unreasonably high cost.

4.2.4 Stratification and multistage sampling

Stratification involves the division of the population into strata, or subgroups, and you sample separately from each stratum, using if you wish, different sampling weights or even different sampling procedures. A common reason for using stratification in research in developing countries is that maps and list sampling frames

are available for urban areas but unavailable for rural ones. So researchers use two sampling procedures (Bilsborrow et al. 1984). Another reason is that the populations in the different strata are of particular interest and are considered for separate analysis. For example, in the Community Information, Empowerment, and Transparency (CIET) telecentre study in South Africa, communities that had a telecentre and those that had one planned for the near future were treated as separate strata (Andersson and Pascual-Salcedo 1998).

The total variation in a population equals the variation across strata plus that within strata. For example, urban and rural areas differ in average household distance from a telephone, and access to a phone also differs within urban and rural areas. Stratified sampling takes the difference between the strata out of the calculation of total variation. Thus, the general objective of stratification is to arrange the strata so that they differ as much as possible from each other but contain populations that are as homogeneous as possible. To achieve this goal, the variables that distinguish the strata are chosen to be closely related to the survey subject, as this eliminates the between-strata variation from the total variation.

Another consideration in using stratified samples is determining the number of strata to select. One should have, at a minimum, two primary sampling units per stratum (for example, residential blocks), and it is generally better to have fewer strata constructed using several variables (for example, rural–urban and distance from a telecentre) than many strata structured according to one variable.

One advantage of having a stratified sample is that the strata can be weighted. Ideally, one selects a higher proportion of units (for example, households) in the strata where the variance is greater or the cost of obtaining the sample is less. For many studies, this means oversampling in urban areas, where variance is usually greater and it costs less to collect the sample.

One of the main advantages of multistage sampling is that it can dramatically reduce the cost of field operations. In the first stage, the researchers can use an existing frame, such as a map or census, to select areal units and then do the more costly mapping operations only for the areas selected as the primary sample units. Most national surveys in developing countries have been multistage ones.

At some point, multistage sampling involves "cluster sampling," usually at the second-to-last stage. In cluster sampling, the units of analysis are clusters of respondents, such as all households in a city block, a section of a village, all members of a household aged more than 15 years, or all children in a secondary

school. Clustering sampling produces huge savings in field costs. Choosing the cluster size involves two types of consideration: it should match the organization of field work and the survey objectives; and the larger the cluster, the larger the sampling error (because the farther the sample is from a random or probability sample). More discussion of these considerations is given in Bilsborrow et al. (1984) and Kish (1965).

4.2.5 Finding the needle in a haystack

One of the challenges in sampling design is to capture "rare elements" in the sample in sufficient numbers and at the lowest possible cost. This is a common problem for researchers in developing countries, where good sampling frames are less commonly available to use in identifying rare elements. For example, a telecentre survey may wish to sample households with mobile phones or computers or those with experience using a telecentre. The sample pool may be fewer than 10% of all households in the survey area. Clearly, evaluators conducting a survey based on probability sampling will spend 90% of their efforts collecting data on households outside the interest of the study.

Kish (1965) identified eight ways to find rare elements. These include stratified sampling with disproportionate sampling fractions and **multiphase or sequential sampling**. Multiphase sampling involves the selection of elements (respondents) from a larger sample: the first phase acts as a screening process and, in the second, more contained phase, the researchers can use probability sampling at a reasonable cost.

Another approach is to use tracing techniques to locate rare elements or respondents. This is common in migration surveys, in which researchers first identify migrants through their original households. In the case of telecentres, all users over a certain period might be "traced" back to their households, and this would delineate a survey sample.

4.2.6 Sample size

One of the most important decisions in designing a survey is choosing the sample size. Choose too large a sample, and you will spend more money than necessary on data collection and processing; choose too small a sample, and you may end up with inclusive findings and poor credibility. There are statistically valid ways of determining the sample size, depending on whether the analysis will use simple or complex statistics (Kish 1965).

An important consideration is the "crucial subgroup." This is the group — frequent telecentre users, for example — from which the survey must obtain enough observations to result in reasonably accurate statements, such as "frequent telecentre users have higher incomes and higher education levels than occasional users or nonusers." If the analysis will come from only a part of the sample, then the sample size has to be increased significantly to maintain the level of accuracy.

Another approach is to consider the sampling error for the difference between two groups on a particular variable that is important. Assuming that each group — nonusers and occasional users of telephone service, for example — constitutes about 30% of the total sample and that about 50% of nonusers and 56% of occasional users are male, then to show that the 6% difference in gender composition between the groups is significant, one would need a total sample size of 2 300 (Lansing and Morgan 1980)!

In the end, cost and efficiency determine most sample sizes, and these considerations tend to result in smaller samples, which are less robust when complex statistics are applied to them. The CIET baseline survey in South Africa, in which 14 086 adults in 12 472 households were interviewed, is one of the few telecentre surveys with samples large enough to withstand major statistical manipulation (Andersson and Pascual-Salcedo 1998).

4.2.7 Sample frequency

Researchers repeat surveys over time to collect longitudinal data, and the length of the interval between surveys will depend on the nature of the data and on the costs and time required for each survey. If the objective is to measure a trend over time, the frequency of repeat surveys may be more than if the objective is to determine overall impact in 5–10 years. Researchers should consider the expected rate of change. For example, evaluators might expect the introduction of a telecentre to lead to changes in travel patterns within 1 year, whereas a change in employment rates might be expected to take 3–5 years. Another reason for resurveying is to gauge the impact of a specific intervention, such as the opening of a telecentre.

4.3 Issues related to surveys

The survey is likely to be the most common method used in the Acacia Initiative to study the use and impacts of telecentres. As discussed above, evaluators can use surveys to measure telecentre performance (and user satisfaction) and to evaluate

the broader impacts on the community, depending on the target sample of respondents. Surveys are particularly susceptible to what Kaplan (1964) called "the law of the instrument," which is illustrated in the story of the child who, given a hammer, will discover that a great many things need pounding.

At the outset of a study, a number of decisions are made about the design of the survey, selection of respondents, and procedures to follow in the field and in the analysis. Some of the issues surrounding these decisions are highlighted here to help the research team think them through. Again, this section is not a textbook on how to carry out surveys (the bibliography gives some suggestions for reading on both the practical and the theoretical aspects of designing and conducting surveys). The purpose of this section is to focus attention on some of the issues researchers need to think through as they design their methodology, so that they do not hammer away at things that don't need pounding and that, when they do pound on something, they hit the nail.

4.3.1 Surveys for various purposes

The main purpose of most social surveys is to explain (or to contribute to the explanation of) certain social or economic phenomena. In the case of telecentre surveys, the purpose is primarily to explain phenomena relating to patterns of behaviour in the use of information and communications, both in the telecentre and beyond. The explanations sought may fall under the deductive model (a behaviour or event is explained by deduction from other facts) or what Kaplan (1964) called a "pattern model," in which the reason for a behaviour or an event is known if it fits into a known pattern or system. Researchers use surveys under these models of reasoning to find out why people do something or why something happens. These models are used to

- Support predictions about behaviour now and in response to policies, events, and circumstances in the future;
- Provide input into simulation models on aggregate behaviour and system changes; and
- Evaluate the performance and impact of events, organizations, policies, and technologies.

The use of these methods for any of these purposes raises issues in the collection of survey data: whether controls are needed, at what level the sampling regime will be statistically valid, whether a single survey will suffice, and how the questionnaire or observation schedule is to be administered. For the telecentre studies, the most important purpose for conducting surveys is likely to be evaluation.

4.3.2 When surveys are not useful

It should be recognized that in some situations, surveys are not useful. These situations relate to the purpose of the research, the level of data aggregation, and the nature of the phenomena studied. The most common situation in which surveys are misused is when researchers work without a clear hypothesis or a specific issue to guide and structure their survey, beyond a set of "interesting questions" (the need to identify research questions and define the explanatory system was discussed in section 2.1). However, surveys are also inappropriate for testing single elaborate hypotheses. In general, they are best suited for choosing between alternative hypotheses (Lansing and Morgan 1980).

Surveys should not be undertaken if the interviewers need to deceive the respondents about the purpose of the survey or if the study focuses on illegal behaviour, such as malpractice among telecentre operators (see section 4.3.7). Surveys are not good for estimating aggregated national data, particularly where the distributions may be skewed. And, as indicated in section 4.2.5, they are also ill-adapted to the study of rare phenomena.

4.3.3 Alternatives to community surveys

The Acacia Initiative can obtain some (but not all) of the data of interest by surveying more targeted samples, such as telecentre users; telecentre operators and staff; leaders and staff of other institutions, such as a health clinic or school; and leaders and members of local groups, such as women's and youth groups, chambers of commerce, and craft cooperatives. These samples are less costly to survey than a representative sample of households in the community or telecentre catchment. Researchers can also more easily trace respondents in these samples for re-interviews. Clearly, it is of both theoretical and practical interest to survey these groups whenever possible and appropriate.

However, if several different subsamples are selected, then some common data should be collected across all sample surveys to measure how the groups

differ on key socioeconomic and behavioral dimensions. In addition, it is best if a representative sample of households in the community is also surveyed, which can *inter alia* provide information on the proportion of the community represented by the subgroups and how far the behaviour of each subgroup influences or explains the patterns found in the broader community.

4.3.4 When and why you need community-level data

Community telecentres are, by definition, a community service. Telecentre users are, by definition, individuals. These individual users may visit the telecentre on behalf of other members of their households (or for the household as a whole) or a group or organization. The decision to use the telecentre is sometimes made by a group. Thus, the individual's purpose in using the telecentre, the money he or she pays for the service, and the outcomes of the visit are best understood at the level of the household, group, or organization. Consequently, research on the use and impact of telecentres must consider more than one explanatory level in its research hypotheses and instrument design. These levels include that of the individual and those of the household and organization or group to which the individual belongs.

Another important level is that of the community. Studies of various social and economic behaviours (such as decisions to migrate, to invest, or to use services such as family planning; the propensity of farmers to adopt innovations) have shown that community-level and individual-level variables have independent effects (Bilsborrow et al. 1984). It would be surprising if patterns in the use of information and communications were any different. Thus, if the researchers aim to explain the phenomena of information and communications and their impacts on people and the community, they will need community-level data, too.

Communities — their geography, economy, demographics, and services — provide "opportunity structures" for individuals and households and can act as major determinants of social behaviour (Ritchey 1976). Conversely, these opportunity structures are, themselves, altered by the communication behaviour they engender, including the long-term sustainability of the telecentre. Researchers also need to use community-level variables to explain why people do **not** behave in certain ways (for example, communicate with family or use the Internet).

For all the above reasons, researchers should consider the community in the conceptual model and the data collection for telecentre studies. The necessary data will range from baseline information on the services in the community, to demographic and socioeconomic characteristics of the population, to information on norms and patterns of behaviour.

4.3.5 The theory of interviewing

The purpose of a theory of interviewing is to guide the researcher in developing a technique to obtain high-quality data at the least cost, both to the researcher and to the interviewee. An interview is a social transaction in which information is exchanged between people who differ in their reasons for engaging in the exchange, in their levels of knowledge on the subject, and in their perspectives and biases. A number of studies have shown that the views of the interviewer on the subject matter influence the way she or he records a respondent's answers and that the interviewer's perceptions of a respondent can introduce even more interviewer bias (Hyman 1954). Consequently, a body of best practice in survey interviews has evolved to minimize interviewer bias and to measure and control for it (Hauck and Steinkamp 1964; USCB 1968).

A second focus of the theory of interviewing is the respondent's motivation for participating in a survey. Generally, a respondent's initial motivation is weak. One way to encourage people to participate is to build into the survey a process for providing feedback to respondents on how the group responded. More generally, motivation is related positively or negatively to any of three factors: the stated purpose of the study, who is sponsoring or carrying out the study, and the social situation that the interview presents.

The last factor is the most influential. It is generally accepted that in most circumstances the interviewer should be as similar as possible to the respondent in race or ethnicity, local language or dialect, gender, age, and status. Also important is how the interviewer conducts the interview to ensure that the respondent understands the questions and answers them fully and to avoid nonresponse (see section 4.3.7). In North America, women and younger people are found to make the best interviewers for most topics. The usual interpretation for this is that the most successful interview situation mirrors that of the experienced teacher (the respondent) teaching the student (the interviewer). The accumulated body of evidence on interviewing shows that survey results are only as good as the interviewers who collect the primary data, so it is worth paying attention to their training and performance.

4.3.6 Dealing with nonresponse

The key issue with nonresponse is whether the nonresponders are similar to the rest of the respondent group or systematically different (for example, from a different ethnic group, illiterate, opposed to the telecentre). One strategy for

reducing nonresponse as much as possible is to choose a better survey method. Different methods of surveying similar populations have very different characteristic nonresponse rates. In the United States, for example, the nonresponse rate for census surveys is usually less than 5%; for research surveys that use personal interviews or telephone interviews, 10–25%; and for mail surveys, up to 90% (Lansing and Morgan 1980).

A second strategy is to follow up on nonresponders, either with another personal visit or, where appropriate, with a telephone interview or a reminder in the mail. Or the nonresponders can be replaced with other respondents (the "go-next-door" approach), although this procedure has built-in biases (are people who are likely to be "at home" next door similar in important characteristics, such as employment, to those not at home?). It is important that the instructions to interviewers be very clear about what procedure to follow if a designated address turns out not to be a house or is vacant or the occupants are consistently not at home or refuse to be interviewed and how the response in each case is to be designated, as this affects the measurement of error from nonresponse.

A different strategy is to try to find out whether the nonresponders differ from respondents and allow for that in the analysis. The sampling frame may help here. But, more commonly, we know very little about nonresponders in most surveys, and, for simplicity's sake, we assume that they are not significantly different from the respondents in the sample. If the nonresponse is limited to one or a few questions, analytical techniques to substitute information from the rest of the sample may be helpful (for example, computing household income on the basis of like responses to other questions, such as ownership of household goods).

4.3.7 Mortality in longitudinal surveys

In surveys that reinterview the same respondents or panels of respondents, attrition ("mortality") of the sample group is inevitable. Respondents may refuse to be interviewed a second or third time. More likely, they have moved away, are unavailable, or cannot be traced. In the United States, typical panel mortality rate for surveys is 10% for each survey "wave" done 6 months to 1 year apart. This means that after five surveys the sample may be only half as large as it was originally (Kish 1965). The evaluation team needs to take account of these cumulative losses in its initial survey design and decisions about sample sizes. The problem becomes more serious if the respondents who are lost from the study differ systematically from those who remain (and several studies indicate that they seem to).

4.3.8 Ethics of interviewing

Evaluators need to consider two related ethical aspects when designing a survey and elaborating the procedures for the field and for data analysis. The first is to ensure that the interviewers understand the meaning of *informed consent* and their obligation to obtain it from the respondent before beginning an interview. An interviewer must tell the respondent about the purpose of the survey, who is conducting it and for whom, and how the respondent's responses will be used. In some situations, it is accepted that informed consent is given by the head of a household, the parent of a child, the teacher of a class, or the leader of a group (for example, "headman"). After requesting and receiving the consent of an authority figure, the interviewer should make every effort to ensure that the individual respondent also understands and gives his or her consent.

Normally, the results will only be reported for groups of respondents; their individual responses will not be identified. If a particularly descriptive or apt response is quoted, it should be done in such a way that an individual respondent cannot be identified. If possible, the interviewer should ask for the respondent's permission to use the quote.

If interviewers take the names and addresses of respondents, these should be recorded separately from their responses. In practice, this means that the interviewer records a respondent's personal information on a separate sheet, linked to the responses only through an identifier number, and the evaluation team does all analysis of the responses under the identifier number. Access to the personal information is restricted to supervisors and others who need to know, especially for follow-up interviews or feedback.

4.3.9 From questionnaire to analysis

The research team will design and follow a set of procedures for processing the survey data from the point at which the data are obtained on the questionnaire to the point at which analysis can begin. The steps will include checking that the questionnaires have been properly completed, assigning identifier numbers, dealing with nonresponse, coding responses, cross-checking the coding, data entry, checking for errors and consistency, and generating new variables.

For many researchers, this part of the survey process is usually the one they most dislike and neglect. However, the interview phase is interactive and interesting, despite the practical problems it may present. Analysis is rewarding because patterns begin to emerge in the data, hypotheses are tested, and results

begin to make sense. But in between, when the data are being quantified and prepared for analysis, the doldrums can set in. It is also, therefore, a time when errors creep in.

A generally recommended strategy is to postpone to a later stage any work that can be postponed, on the rationale that as the process progresses from respondent to computer, the next stage is more specialized but less expensive than the previous one. As a general rule, the survey design should not have the interviewers trying to code in the field. It is cheaper and more accurate (and verifiable) to have coders in the office and let the interviewer concentrate on the respondent's answers.

On the other hand, CIET Africa in Johannesburg has found that locally trained interviewers can also be trained to do coding and data entry and that they bring a new enthusiasm to the data-processing tasks. Working in pairs, they act as cross-checkers, and their experience as interviewers gives them valuable insight into the data (Andersson and Pascual-Salcedo 1998). This approach supports the role of Acacia as a learning experience for local participants and is to be recommended. It not only produces good-quality work but also leaves a repository of new skills in local organizations, which will benefit the communities after the project has ended.

5. Matching Research Methods to Data Needs

This section briefly introduces some of the methods and techniques that are most useful for studying and evaluating community telecentres. Its purpose is to help the reader select the most appropriate ones for a specific telecentre research project or evaluation study. As these guidelines can provide only a brief discussion of each technique, the emphasis is on their strengths, limitations, and suitability for various purposes. The reader may consult the bibliography for more detailed practical guidance on how to develop the instruments and apply the methodology.

Avoid the single-method solution

As a general rule, there is strength is having more than one method in any study. Some methods are clearly better suited to certain kinds of data and social situation, and reliance on a single method (usually a questionnaire survey) inevitably reduces the richness of the data and the possibility of cross-checking information. Data on how people use equipment is better observed than obtained later from an interview; why people wanted to use the equipment and how they felt after the experience can only be found out by asking them.

Match the method to the available human resources

Other important considerations include the time and resources available to the research project and particularly the availability of trained researchers and field workers. Some of the methods described here should be implemented by researchers with specific training in using them, at least in design, coding, and analysis. This includes the use of projective techniques and attitude scales. Other methods are more robust in their application, such as observation, performance reports, and self-assessments. Group techniques require a facilitator trained and skilled in leading group discussions. Questionnaire surveys are more difficult to design well than most people believe, but field assistants with limited training can effectively carry

out a well-designed survey instrument in the field, and a well-designed survey instrument is the key to good data collection.

Match the method to the type of data needed by the stakeholders

Another consideration is the type of data needed by the various stakeholders. At the local level, highly statistical information is probably less useful than the more in-depth, qualitative kind that enables education and learning. However, potential investors in telecentres and international donors may require data with provincial or national validity, so a good sampling design is crucial. They may require financial data with statistical significance. The mix of stakeholders and their information needs will influence the research design, sampling strategy, and mix of methods.

5.1 Performance reports

One of the most cost-effective and valuable sources of information for both marketing the telecentre and evaluating its performance will be records or daily logs, so, from its opening, the telecentre should institute a regular monitoring system as part of the operator's duties. Activity records can be filled in by telecentre staff or by the user, or they can be fully automated on the telecentre's equipment. In all cases, it is important to maintain regular weekly or monthly tabulations, summary reports, and reviews. These will give the telecentre operator and management ongoing feedback on performance, show them where the problems lie, and suggest possible improvements. Without a regular review process, the accumulated data serve little purpose and soon become too daunting an accumulation to process.

Telecentre equipment can generate records that are useful in evaluating performance and financial sustainability. Jensen (personal communication, 1998[6]) proposed breaking down services into three types (Table 18). He suggested that, where the equipment is available, an automatic "till" should be the core of the telecentre record-keeping system, with each type of service prerecorded for a key, which when pressed, prints on the bill the cost of each service provided to the customer or records every transaction in the system for daily, weekly, or monthly reports for the telecentre operator. Such an automated system could also readily record and display varying rates for peak and off-peak hours and discounts for special groups or individual customers.

[6] Mike Jensen, Consultant, South Africa, personal communication, 1998.

Table 18. Types of service records to be monitored in telecentres.

Record type	Applied to
Hourly rentals (peak and off-peak tariffs; special rates for certain groups)	• Meeting space • Television • Audiovisual equipment, overhead projector, cameras, etc.
Unit sales	• Fax pages • Photocopy pages • Postal services • Stationery and other goods sold
Service minutes (peak and off-peak rates; individual and group rates)	• Telephone calls • Internet access • Video-conferencing • PAT for help in using equipment • Business services (typing, web searches, spreadsheets, etc.) • Provision of government information • Training • Book loans

Source: Mike Jensen, Consultant, South Africa, personal communication, 1998.
Note: PAT, personal assistance time.

Telephones systems can also provide records of the time and duration of outgoing local, long-distance, and international calls, and the telecentre can charge for these calls at various rates, depending on the time of day and day of the week. In many telecentres, incoming calls are an important service not recorded by the telephone company, and the telecentre operator may have to record and charge for these calls. In some countries, itemized phone bills are available, which makes the record-keeping easier. In general, regular monitoring and log-keeping should demand as little of the time of the operator and staff as possible.

Computer systems can record online and offline usage and the number of pages printed and e-mails sent and received for all regular users who have an account and for occasional users with guest accounts issued by the administrator. Researchers can analyze these data for various pieces of equipment and users, including use of caches and bookmarks.

Administrators can also ask users to fill in a report on each visit. An automatic login screen would ask them to login using their telecentre user identifier or password, rather than their name. The logout screen could be designed to ask them for additional information, such as why they use the service and how satisfied they are with it. The alternative would be to ask users to fill in a sheet or book to report on the services they used (and even the staff help they received) when they pay.

Ideally, the system would automatically cover every user and every visit, providing the basic information on services used and income received that the telecentre needs to run as a business, as well as collecting information on the user, such as gender and address. One major concern here is with the telecentre users' right to privacy, and each research team and the management of the telecentre would have to discuss this issue in its local and national contexts. However, log books are already commonly used in some African telecentres, and customers are accustomed to filling these in on each visit.

More service-oriented and evaluative information can be (sparingly) added to such a standardized recording system, or, more likely, can be obtained through voluntary user surveys conducted at the telecentre on particular days or on a sample of all users.

5.2 Questionnaires

Many books and guides provide advice on developing questionnaires for various purposes in various contexts. Some are listed in the bibliography. This section focuses on the design choices that should guide the selection of types of questionnaire, format for interviews, and types of questions. (Section 5.3 will discuss more advanced techniques that can be used for questionnaires to obtain information on how people feel about situations, rather than what they know about them.)

5.2.1 Choosing a questionnaire format

Questionnaires are either self-administered by the respondents or given by an interviewer. For those in which the respondents fill in the answers themselves, the layout and instructions must be clear, so that errors are minimized. For those filled in by the interviewers, the instructions may include **probes** (or supplementary questions to be asked) and **codes** (for initial analysis of the responses) (Table 19). All questionnaires must be pretested to ensure that they are clear, that the question order seems logical to the respondent, and that the questions and wording are presented without bias, offence, or ambiguity. Pretesting can also familiarize the interviewers with the questionnaire.

Questionnaires are usually classified as structured, semistructured, or unstructured. **Structured questionnaires** usually have questions with an anticipated range of responses so the answers can be coded or scaled beforehand. Researchers use structured questionnaires when they are reasonably confident that they know the range of answers and can therefore "close" the questions to limit

Table 19. Examples of alternative question formats for questionnaires.

Question format	Example
Open	What kind of information do you need? *[Probe]* Do you need any other kind of information? **Response** *[record verbatim]*: _____ _____
Precoded open	What kind of information do you need? *(Probe)* Do you need any other kind of information? **Response** *[record verbatim]*: _____ _____ *(Coding) [do not read list to R; check as many as R mentions]* ☐ Job opportunities ☐ Market prices ☐ Government information ☐ Weather ☐ Education or skills upgrading ☐ News ☐ Specific applications (health, agriculture) ☐ Other
Closed	Which of the following types of information do you need? *[Read list to R; check each one that R agrees with]* ☐ Job opportunities ☐ Market prices ☐ Government information ☐ Weather ☐ Education or skills upgrading ☐ News ☐ Specific applications (health, agriculture) ☐ Other
Forced choice	Which type of information is most important to you? *(Probe)* If you had to choose one now, which would it be? *[Record only one alternative]* ☐ Information to help me in my work or business ☐ Personal information about friends and family

Note: R, respondent.

them to certain responses. **Unstructured interviews** have mainly open questions, without any limitation on how the respondent should answer, and these interviews usually have a schedule of questions. But the interviewer may vary the order of topics to follow the lead given by the respondent, to make the interview more like a natural conversation.

The most unstructured interviews are sometimes called key-actor or key-informant interviews. **Semistructured interviews** are a combination of the two: they combine the advantages of each type as appropriate to the various topics covered in the interview. Thus, structured questionnaires have a specified order for the questions, and the majority of its questions are closed or precoded. With typically unstructured questionnaires, on the other hand, the questions are open, the responses are recorded verbatim, and the order of the questions varies. Both structured and open questions can refer to the present, the future, or the past, and in this way the questionnaire can retrospectively probe for past behaviour and events and prospectively probe for future intentions.

Questionnaires can be made more structured after sufficient pretesting has indicated the range of responses that can be expected from 90% or so of the sample. The advantages of structured questionnaires are that they can usually be administered more quickly and are less subject to interviewer bias and coder error. Structured questionnaires are used to treat large samples and large amounts of data, as they are usually the most cost-effective. They are used to gather purely factual information, rather than information on how people feel about sensitive issues.

Unstructured questionnaires and open questions are used if the answers are not known or categorized beforehand. The interviewer writes down the response verbatim. Later, the researchers will have to list these verbatim responses (or a reasonable sample of them) and construct coding categories that are relevant to the study and fit the majority of cases. To ensure consistency and reduce coder bias, at least two independent "judges" should be involved in developing the coding categories and in coding the responses under these categories.

The researchers should clearly use the unstructured approach if they do not know the range of responses before the survey and they expect to obtain much "richer" data from the variety of answers they record. The downside is that the interview and coding phases take longer and need to be administered by more experienced and better trained people. In practice, the research leader often takes responsible for the initial development of coding categories, so that he or she can get a feel for the data and how well the survey interview is working.

In questionnaire surveys, the researchers treat each interview as a unit of analysis and give equal weight to each one (unless they expect to do some statistical weighting later with subsamples). In key-actor interviews (sometimes called elite interviews) or unstandardized interviews, the researchers may decide not to

treat the respondents' answers equally. Some respondents will be better informed or more influential, and their responses will have to carry more weight in the analysis. Thus, whereas evaluators would handle a unique or different response statistically in a questionnaire survey, they may give importance to an unusual response in an "elite" interview over and beyond its statistical frequency. Also, in elite interviews the interviewer tries to let the respondent lead, even to the point of allowing the respondent to define the situation in his or her own terms. The aim is to have something that sounds like a discussion but is, in fact, a quasi-monologue by the respondent (Dexter 1970).

5.2.2 Selecting between alternative question formats

Question formats parallel those of questionnaires: questions can be open or closed, with precoded open questions falling somewhere in between (see Table 19). Using precoded open questions, interviewers gather a verbatim response and do not constrain the respondents. Moreover, pretesting these questions enables interviewers to code most responses directly, thus simplifying data processing. As a general rule, open questions on any topic are asked before closed questions so that the coded categories do not influence the open-question responses.

An example of a forced-choice question is given in Table 19. Such questions require the respondent to select from two or more alternatives the one that comes closest to their own situation or opinion. The alternatives must be simple and roughly opposite on some relevant dimension. These questions are sometimes difficult to administer because respondents feel that none of the alternatives offered fits their situation, and they need encouragement to select the one closest to it. Thus, their response is literally "forced." These questions are mostly used if the researchers want the respondent to consider the alternatives and "select sides." They have been used in personality measures and can be seen as a two-point-scale question.

Scaled questions require respondents to indicate their degree of agreement or disagreement with a given option by assigning it a value on a scale (Table 20). The scales (sometimes called Likert scales) vary from three points to a continuous line (usually 100 mm long) on which people mark their position for or against a particular item. Researchers can then simply measure this mark and convert it to a percentage. Scaled questions have an important advantage for analysis: they provide ordinal, rather than nominal, data. When properly constructed, the scales (such as attitude scales) can provide interval data and therefore more interesting possibilities for analysis. But constructing scales is rigorous and time consuming.

Table 20. Alternative formats for scaled questions.

Type of scale	Example
Three point	If the telecentre provides public phone service at a cheaper rate on weekends, would you make more or fewer calls to absent family members or about the same number as now? *[Read out and check one only]* *[Don't read out]* ☐ More ☐ Fewer ☐ About the same ☐ Don't know
Seven point	*[Show or read out scale to R and then circle the appropriate number for R's response to each part of the question. If R says "Don't know" check 8, but do not suggest it]* Very positive difference 1 · Somewhat positive difference 2 · Slightly positive difference 3 · No difference 4 · Slightly negative difference 5 · Somewhat negative difference 6 · Very negative difference 7 If the telecentre provides the following services, how much difference do you think it will make to you? Daily market prices for crops 1 2 3 4 5 6 7 8 Export prices for local goods 1 2 3 4 5 6 7 8 Job opportunities in the city 1 2 3 4 5 6 7 8 Training courses for certification 1 2 3 4 5 6 7 8 Networking with other groups 1 2 3 4 5 6 7 8
Continuous	Here is what some people are saying will happen after the telecentre opens. Do you agree or disagree with them? Show how far you agree or disagree by marking the line with an X. If you neither agree nor disagree, put your X in the middle. "The community will develop economically" Strongly agree ——— Strongly disagree "Young people will spend their time and money there" Strongly agree ——— Strongly disagree

Note: R, respondent.

Also, most scales with verbal labels have three to seven points. More complex scales make the rating task too difficult for the respondent and do not provide ratings that are any more accurate — probably the opposite. The advantage of labeled scales is that the labels can be read out by an interviewer, and this format is therefore suitable for interviewer-administered questionnaires. The wording of the labels is known to influence the respondent's ratings, so these questions require considerable pretesting (Whyte 1977). This is why linear scales with labels only at each end of the scale are popular. However, these scales require the respondent to self-administer the questionnaire and be able to visually measure proportions along a line. Such questionnaires may also appear to be more accurate than they are, as people probably don't make such fine distinctions for most topics. Nevertheless, this method can be successfully used in group sessions; with group participation, the facilitator can mark the line, leaving more time for discussion.

5.2.3 Putting them together

The best questionnaire has varied question formats and maintains an interesting flow of topics. It should have a logical sequence from the perspective of the respondent, and each question should be clear and understandable. Sample groups used to pretest questionnaires must have characteristics similar to those of the respondent group. Without pretesting, it is simply impossible to anticipate all the ambiguities, conflicts, and difficulties that the wording, presentation, and order of questions will present in the field. Questionnaires have demonstrable order effects. To cancel out the order effect over the entire sample survey, researchers should develop two or more versions of a questionnaire, with the same questions occurring in different order. Similarly, scale questions have known order effects. For example, the right-hand label of the scale or the last-mentioned alternative is the most likely to be selected. The order of labels on scales and "positive" versus "negative" statements should therefore be randomized or at least varied.

Generally, questions on personal information, such as age, education, and income, appear near the end of the questionnaire, when the interviewer has a well-established rapport with the respondent. If information might be sensitive, questions can be devised to elicit this information in terms of ranges, rather than specific numbers, such as an income range (4 001–5 000 Ugandan shillings) or an age range (30–45 years). Ideally, the questionnaire should include some internal

and external cross-checks to evaluate the validity of the data. An internal cross-check might be provided by asking two questions, spaced well apart, essentially requiring the same or consistent information but in different ways. An external cross-check might be provided by asking a question requiring data obtainable elsewhere, such as from a census, another survey, or telecommunication records.

5.3 Projective techniques

Projective techniques can help to obtain freer, less self-conscious responses, based more on feelings than on knowledge. They have been developed in research psychology and clinical psychiatry, and some can be adapted and simplified for use in surveys or group situations. Essentially, the techniques enable the respondent to "project" their own thoughts and feelings onto another person or organization, identified verbally or pictorially in the question. In contrast to the projective techniques used in the laboratory or the proverbial clinical "couch," those in the field must be more superficial and simple enough for interviewers with a little training to administer. These techniques can give insight into people's perceptions, attitudes, values, and personalities, which can in turn reveal patterns of behaviour and community dynamics. Such techniques may be less familiar but are worth considering as one ingredient in the methodological toolbox for studying telecentres.

Projective techniques range from simple word association to a request to create a story out of a given lead idea or picture or to play a role in a gaming situation. Some are biased toward literate respondents, and others require respondents to work with paper and pencil, and they are therefore more suited to group situations and key-actor interviews, rather than questionnaire surveys. Others, such as the semantic-differential test, take too long to administer in most field situations (the semantic-differential test will not be described here, although it provides interesting information on what word labels actually mean for people). The projective techniques introduced below are simple and have been used successfully in developing countries and field situations, but it should be noted that they all require pretesting in the field and in the language of the interview.

5.3.1 Adjective checklists

Adjective checklists are simple lists of adjectives presented to the respondent to describe any situation or topic, including the telecentre, the frequent users of the telecentre, or some other physical or social aspect of the community. The adjectives should be developed from pretests in which respondents provide open

responses describing the attributes of the telecentre and community and express a range of feelings and characteristics of interest to the project. Don't make the list too long or it becomes a wearisome task for the respondent, and don't use the technique more than once or twice in the same questionnaire.

5.3.2 Sentence-completion tests

In the sentence-completion test, the respondent is asked to complete a sentence. For example, the sentence stem might be "When I think of family members who are working abroad, I ... " or "When I want to get news from town, I ... ."

The stems are read out by the interviewer, and he or she records verbatim and later codes the respondent's sentence completions (see example in Table 21).

Table 21. Examples of sentence-completion tests and structured scenarios.

Projective technique	Example
Sentence-completion test	When I want to contact my absent family, I ... When I think of the telecentre, I ... When [village] does a community project, it usually ... What we hope for our children is to ...
Sentence-completion coding example	When I think of the telecentre, I ... *(Coding) [do not read list to R; check category that R mentions]* ☐ Mentions cost ☐ Mentions fear of technology ☐ Mentions other people using it to get ahead ☐ Anticipates using its services ☐ Mentions economic impacts on community ☐ Mentions social/cultural impacts on community ☐ Doesn't know about it ☐ Other response
Structured scenario	*[Read the story and the three alternatives to R. Repeat if necessary and give R time to answer. Encourage R but don't bias the response]* "One farmer had very productive land and did well for many years. Then the market changed and prices for the crops he grew were very low. Other farmers changed what they grew, but he didn't and his family suffered. People talked a lot about it. A "Some said that it was the man's fault. If he'd done things right, he wouldn't have become poor. B "Others said that you can't blame a man when things change. We have to learn to accept what happens to us. C "And others said that it was just another example of what happens when new ideas and technologies come and you have to change with the times just like everyone else." Which people do you most agree with?

Note: R, respondent.

Only an experienced researcher can establish the initial categories for coding. Sentence-completion tests are one of a series of projective tests, ranging from word association to paragraph and story completion, and are suitable for questionnaire surveys in different parts of the world. They enable the respondent to answer freely, once the subject has been set by the sentence stem, and can reveal significant differences between individuals and between social groups. In a survey situation, one uses about six sentence stems, which means that the design of the survey can include a cross-check for internal validity. All projective tests, including sentence-completion tests, must be field tested to ensure that they provide effective measurements and that respondents understand and accept them. Sentence-completion tests do not work in some cultural situations and in some languages.

5.3.3 Scenarios

Since Kahn and Wiener (1967) popularized the use of scenarios in their book *The Year 2000: A Framework for Speculation on the Next Thirty-three Years*, scenarios have been best known for their use in foresight exercises. A *scenario* is defined as "a hypothetical sequence of events that focuses attention on causal processes and specific decision points." Scenarios are not forecasts but plausible stories describing the future. Used in foresight exercises, they are structured to address

- Current issues, trends, and events of interest to research or policy;
- Determinable and somewhat predictable elements in the environment; and
- More uncertain elements (trend breakers, turning points, or weak signals of change).

A well-constructed scenario presents an internally consistent story about the path from the present to the future. A scenario is relevant to the issue of interest and the group, recognizable from the current perspective, and challenging: it contains some elements of surprise or novelty requiring the group to stretch its vision. Ideally, a scenario finds the balance between "thinking the unthinkable" and being grounded in the reality of today, so that it is believable (that is, either possible or probable). Scenario-building is a useful group exercise to help people imagine alternative futures for their organization or community. Doing the exercise is often as valuable as the results.

Surveys or focus groups can also include simpler and usually more structured scenarios. One advantage of scenarios is that people generally enjoy them and appear to readily "project" their own attitudes and feelings into the story. The challenge with scenarios is in the coding, and one way to ease this problem is to structure the scenarios so that they have three or four alternative outcomes and the interviewers ask the respondents to select the one they prefer or think the most likely to occur. This constrains the respondents' freedom of expression but presents them with ideas they may not have thought of before, so it is a valuable technique, not only for use in group situations, but also for educating people.

5.4 Attitude scales

Attitudes are one of the most well-known and empirically investigated psychological concepts. They are defined as mental and neural states of readiness that are organized through experience and influence our responses to objects and situations (Allport 1935). Attitudes have affective (feeling and emotional), cognitive (thinking, mentally organizing), and behavioral components. In terms of stability, they are assumed to come somewhere between values (long term) and opinions (transitory). They are measured in terms of their direction (positive or negative attitude toward the object), strength, and consistency. Consistency as a measure is rooted in the theory of attitude formation and change, in which people are thought to seek balance or congruity in their attitudes.

Part of the reason why the concept of attitudes has become so well known is that researchers have given so much attention to measuring them, with the result that hundreds of attitude scales are available "off the shelf." These are valuable because the correct construction of an attitude scale requires considerable time and care, and researchers need to validate it on various populations to test whether it consistently measures significant differences in attitude. The advantage of using an attitude scale is that, if properly constructed, it provides interval data, rather than nominal or ordinal data. In questionnaire surveys, they are more commonly used in shortened form, and the researchers analyze the results as ordinal data. These data are easy to analyze because the questionnaires are already constructed for rapid scoring. However, attitude scales are highly situation and culture specific; researchers need to design or test them, or both, in the local cultural context. They are useful for measuring differences in attitudes toward a telecentre between various groups, for example, or any change in the community. Used in baseline and follow-up surveys, they can also measure how these attitudes change over time and how people's views of the new technology change with experience.

An attitude scale is a collection of statements, and the respondent indicates to what extent he or she agrees or disagrees with each statement. The attitude scale can have any one of the formats for scaled questions shown in Table 20. The statements should be short, contain only one idea, and use unambiguous language appropriate to the target population. Researchers should select the final statements used in the scale from a much larger number on the basis of pretesting to calculate the strength of each statement for or against the object. The final scale comprises those statements that appear to cover the range of attitudes found in the study group, and ideally they are "spaced" equally apart in attitudinal distance and consistent in discriminating between people. When they are read out by the interviewer, rather than being read by the respondent in a paper-and-pencil test, they need to comprise simple, easily remembered statements. Further reading on constructing and using attitude scales is provided in the bibliography.

5.5 Observation techniques

Asking questions is probably the main social-research technique, but a great deal can be learned from simply observing people's behaviour during interviews and using the interviewer's observations as data. Survey questionnaires can include questions for the interviewer, such as on house location, housing quality, or social interaction within a family or group. One way to reduce observer bias in interviewing is to use more than one observer and compare their findings. Some of the same issues in sampling and surveys arise with respect to observation techniques. The researcher needs to decide on the unit of analysis and the sampling location and time.

Generally, one selects the locations for observation points purposively, rather than randomly, because they depend on the purpose of the study, such as the evaluation of a telecentre, commercial phone shop, bus station, or market. One usually chooses the sampling time to ensure that various seasons, days, and times of day are included in the observation schedule. The duration of sampling will typically vary from a few hours to a whole day. Participant observation (see section 5.7) can have a more or less continuous observation period. Individuals and groups can also be selected as observation units, although here the issues of privacy become more important, and interviewers should obtain some form of informed consent. In a telecentre, the unit of observation can be a particular piece of equipment, a staff person, a group of schoolchildren visiting the telecentre, or the telecentre itself.

What kind of information could be better obtained through observation than through interviews? Principally, it is information that the respondent might not be aware of, particularly recall, or wish to divulge. This may include information about his or her interaction with the equipment in the telecentre or with staff or other users, such as how long it took them to complete their task, how often they had to try to make something work, or how often they had to have help. It may include the levels of noise and distraction at the telecentre, how crowded it was, how long people had to wait, what they did while waiting, how well maintained the telecentre was, and whether the environmental quality was acceptable.

Observation techniques can be structured or unstructured. After pretesting the questions, the researchers can develop structured observation schedules and train observers to use them to make simultaneous observations at various observation points. A formal approach to structuring observation is "behavioral mapping," which identifies all the behaviours in a specified area or building. Repeated observations can show how people are using a new service centre, such as a telecentre, and how improvements to its physical lay-out and its hours of service can improve its function and efficiency and the ways people use it. Techniques for behavioral mapping require the researchers to undertake pretesting, select observation sampling points, establish coding categories, ensure cross-checks for validity and consistency, and conduct the field work.

Observation techniques usually demand that the observer does not influence the subject's behaviour any more than is absolutely necessary. Observers should be part of the background. The longer they are in the background, usually the less they will affect people's behaviour.

Sometimes direct observation is neither possible nor desirable, so researchers have to use indirect methods. Indirect observation usually measures behaviour through its impact on the environment, for example, changes in the width and wear of various tracks, as determinants of the paths people most commonly use. Indirect observation usually measures one or more of the following:

- Erosion measures (for example, wear on office equipment and furniture);
- Accretion measures (for example, dust on unused equipment, books); and
- Archival records (for example, sales records, paper used, phone logs).

5.6 Group techniques

Most of the Acacia evaluation studies of community telecentres plan to include some group processes to enable organizations, interest groups (such as farmers, youth, and women) and small groups of users and nonusers, or just community members, to discuss aspects of telecentre operations and impacts important to them. Group processes are valuable sources of information for the researcher and provide learning processes for the participants, as they are exposed to a wider spectrum of ideas and views. A number of techniques are available for researchers to use specifically with groups. Three of them are discussed here: focus groups, nominal groups, and Delphi techniques (see section 5.6.3). In addition, the researchers can use the projective techniques in section 5.3 successfully in group settings to elicit people's feelings and attitudes toward telecentres, communication and information, and community processes, generally.

5.6.1 Focus-group techniques

Researchers can use focus groups to gather qualitative data to compare with survey data, but they should not compare them statistically with survey results. Qualitative data are particularly useful for exploring particular issues in greater depth, including people's feelings and beliefs; identifying differences between groups within the community; and developing follow-up messages and education. A focus-group discussion or interview is particularly good for generating ideas and providing feedback.

A focus group usually comprises 6–15 participants and focuses on a few key topics or questions. In the discussion, the participants talk among themselves, and the facilitator intervenes as little as possible. In a group interview, the facilitator poses the questions and may have a more prominent role, but the process is very similar. The key is to have good facilitation and record keeping; thus it requires two people to run the sessions, even if the discussion is tape recorded. The facilitator or moderator should have been trained and be able to keep the discussion lively, meaningful, and on topic, as well as ensuring that everyone has a chance to speak. A facilitator will need to encourage people who are reluctant to voice their opinions or who feel marginal to the group, and the facilitator may at times need to hold the more loquacious ones in check. The richness of the data comes from the debate, and here the rapporteur must take excellent but structured notes on the range of opinions and the strength of views, as well as who seems to be leading and following. Experience has shown that it sometimes takes one expressed opinion to elicit another, contrary opinion, and thus a wider range of views may be expressed in a group situation than in individual interviews.

In some focus-group discussions, where some follow-up action is expected, the facilitator needs to help the participants find some middle ground or consensus, whereas in other focus-group discussions the participants can be left to simply provide a range of opinions. The CIET evaluation of telecentres in South Africa plans about 500 focus-group discussions and has developed a technique to make the process both quick and effective. Focus-group participants are selected purposively, as meeting specific criteria and as being stakeholders or members of a target group and thus being expected to have an interested in the topic and to have something to say about it. Researchers should hold focus-group discussions with all key-stakeholder groups, all key institutions and organizations in the community, and informal groups of users, nonusers, women, youth, farmers, and other economic groups like small-business people.

5.6.2 Nominal-group techniques

You use nominal-group techniques in face-to-face meetings where you want people to think about a question by themselves and then work on the responses as a group. This is both a rich and efficient way to generate ideas and obtain group input into the evaluation process or ranking of ideas. The group should be small (5–10 participants), and a single session usually takes 1–2 hours.

The participants sit around a table with a leader or facilitator, who opens the meeting by reading a question aloud to the participants. Each participant has a worksheet with the same question written at the top, and they take 5–10 minutes to write down their ideas, without discussing them among themselves. In the next stage, the facilitator goes around the table and asks each participant to contribute one of her or his ideas. These are written down and numbered so that everyone can see them. The process continues around the table until all ideas are "on the table." The group then discusses each idea in turn, so that everyone understands it and they all share their views on it, but the group makes no attempt at this stage to resolve differences of opinion.

The next stage is to rank the ideas. When participants provide more than 10, usually the group selects the top 10 and then each participant ranks them, usually on cards. The facilitator reads out the cards, without identifying the participant, and then records a tally of all the votes. The group then discusses the ranking and may seek further clarification of some ideas or may even collapse two ideas into one. At the end of the process, the participants repeat their individual ranking of ideas on cards, and the facilitator tallies the scores to obtain the final group ranking.

5.6.3 Delphi techniques

Delphi techniques derive from three major findings on group processes. One is that assessments made by a group of people are more likely to be accurate than those made by the same individuals working alone. Second, a few individuals tend to dominate face-to-face meetings, and information is processed less efficiently. Third, people who receive information about the range of individual responses (including their own) to a particular question use that information to improve their own response. In this way, the quality of the assessment improves in each successive round after the participants have seen the results of the earlier round and can recast their own responses. Delphi techniques are thus designed to avoid the distortions of interpersonal processes within face-to-face encounters.

With Delphi techniques, researcher use regular mail or e-mail to send a list of questions or "items" to members of the group for them rank or scale, and they anonymously fill in their answers or ranking and return the list. The composite list of responses from all the members of the group is then circulated back to participants, and they rerank or reanswer in the light of the distribution of responses in the first round. They may also provide some explanation of their rankings or responses. In some Delphi processes, the participants rank their own expertise on the subject, and the views of those with greater expertise carry greater weight in the group rankings.

Through a series of rounds (usually two, because of the time and expense), the participants can reach consensus without seeing one another or knowing whose response is whose. Some Delphi processes aim to reach consensus, whereas others aim to generate as diverse a range of opinions as possible. In a "decision Delphi," as the name implies, the aim is to reach decisions among stakeholders with different interests in a solution, when the issue is a divisive and contested one.

These techniques are more elaborate and time-consuming than nominal-group techniques, but the group does not have to meet face to face. In the case of the evaluation of telecentres, they may be more useful in eliciting the views of national and international stakeholders than those of community members; for community members, researchers can use simpler techniques.

5.7 Participatory and self-assessment approaches

In the methods discussed so far, the roles of the investigator and the respondents are clearly defined. Participatory research methods, in which the researcher is both investigator and participant, are increasingly used in social research, especially in community-development studies. As an approach, participatory methods focus more on the richness and validity of the initial data set than on the manipulation

or analysis of data. Participatory research assumes that the researcher, who is also a participant in the action, will have access to more data and will be able to interpret them more meaningfully, even from the point of view of a respondent. The social relationships between the researchers and the respondents become more important and introduce more bias into the data than during an interview, as these relationships will have lasted longer and be more important to both parties. As a methodology, these methods make it difficult to cross-check the data, with the result that confidence in the reliability of the research data depends on the experience and skill of the participant observer.

The anthropologist Oscar Lewis related an anecdote about the individual differences in participant observers' interpretations, when contrasting his study and that of Robert Redfield on the same community, Tepoztlan, Mexico:

> The impression given by Redfield's study of Tepoztlan is that of a relatively homogenous, isolated, smoothly functioning and well-integrated society made up of a contented and well-adjusted people. His picture of the village has a Rousseauan quality which glosses lightly over evidence of violence, disruption, cruelty, disease, suffering and maladjustment. We are told little of poverty, economic problems, or political schisms. Throughout his study we find an emphasis upon the cooperative and unifying factors in Tepoztecan society. Our findings, on the other hand, would emphasize the underlying individualism of Tepoztecan institutions and character, the lack of cooperation, the tensions between villages within the municipio, the schisms within the village and the pervading quality of fear, envy and distrust in interpersonal relations.
>
> — Lewis (1951)

In fact, both observers — both experienced anthropologists — were right. Their own perceptions led them to emphasize various aspects of the community and seek out informants who also emphasize those aspects. Participant observers have to work hard keep their own preferences and allegiances in check and their observations neutral. It sometimes becomes impossible for the researcher to remain aloof, and many participant observers experience swings of emotion and identification with one group or individual over another as they observe the events of each day. It is important to also record the feelings of the researcher, as they are a necessary adjunct in interpreting the data. Field notes should be recorded soon after the event or at least daily, even if they are reinterpreted in light of later events.

Participant observers usually make extensive use of key informants, who can provide more insight into the research situation. Informants are often self-selected, in that they volunteer to help the researcher and should be chosen with

care. Informants can have an axe to grind and have been known to be marginal to the group at the outset. To reduce the bias generated by key informants, it is useful to have informants from different groups in the community and provide them with some understanding of the research objective and the notion of objectivity.

Self-assessments range from those fully controlled and implemented by the organization or group involved to ones in which the organization commissions an external evaluator to undertake the work, with the organization or group as full participants. Several useful guides to doing self-assessments are available to enable organizations without previous experience or skills to undertake them. Generally, the starting point for doing a self-assessment is either a full-scale review of the organization or one with a focus on a specific problem. Typical reasons for doing a self-assessment relate to strategic decisions, such as those regarding organizational strengths and weaknesses, possibilities for growth or change in the organization's mission and objectives, staffing, and finance (typically the need to raise new funds).

Before the organization or group starts the self-assessment, it is important for the executive or members to engage in a participatory process to agree on the following:

- Its purpose;
- Its scope;
- The data to collect;
- The key issues; and
- The cost and who will pay it.

This enables the organization or group to measure its readiness for doing a self-assessment and using the information it generates. The organization or group will require several types of readiness at the outset (Lusthaus et al. 1999):

- *Cultural readiness* — The culture of the organization or group should be such that it is open to suggestions for change or improvement;

- *Resource readiness* — The organization or group should have the resources (people, time, technology, money) to do the self-assessment and be prepared to commit these resources to this task;

- *People readiness* — Staff should be prepared to work together on the project;

- *Leadership readiness* — The leadership should be prepared to champion the process and provide it with the necessary support;

- *Vision and strategy readiness* — The group should have discussed their vision and strategy beforehand; and

- *Systemic readiness* — The organization or group should have the systems in place to provide the information needed for the assessment.

5.8 Household budgets and diaries

It may be valuable to have some more detailed information on certain aspects of behaviour or decision-making than can be reliably obtained through questionnaire surveys, observation, or group techniques. Another approach is to select a small subsample of people or households and ask them to keep diaries or daily logs of activities or expenditures. Clearly, someone in the household needs to be able to write and fill in the information or someone in the research team must make daily visits to maintain the record. The task should be clear, simple, and quick, or people will forget to fill in the information or make errors. For example, if a record of household expenditures requires respondents to decide under which category to place a particular item, they are less likely to record it and more likely to make errors in categorization when they do record it. The simpler the task is for the respondent, the better are the results. Thus, asking people to simply make a record of their phone calls and the letters they mail and how much they cost is better than giving them a complex chart to complete.

Economists are interested in financial accounting, but equally interesting for the social researcher is how people spend their time. Time budgets are a useful adjunct to household surveys to provide more information on how much time people devote to work, social interaction, home activities, etc. In the case of telecentre studies, it is more interesting to see whether the telecentres save people significant

amounts of time. Anecdotally, it is understood that many people, such as head teachers, business owners, and organizational leaders spend considerable time traveling to town to order supplies, deal with government departments, seek information, etc. Asking some of these people to keep time diaries for selected periods before and after the telecentre opens would help to quantify its impacts on the amounts of time people devote to various tasks.

When designing expenditure logs, it is important to keep it simple for the respondent and to leave the coding for the researcher to do afterward. If time diaries are used to record all activities, the diaries are usually kept for 24-hour periods dispersed over various days of the week and times of year to capture any periodicity or seasonality in behaviour patterns. If the objective is simply to record all behaviour related to patterns in information searches and communications, respondents will have less to record and they can maintain the diary for a longer period. In all cases, it is important that the respondents understand why they are doing this and why the information they may feel is so mundane is actually valuable to the research or evaluation.

One place where daily logs of activity should be kept is the telecentre, and the operator should see record-keeping as a way to improve service and performance and as integral to the job.

6. Data Analysis and Reporting

6.1 General considerations

In section 4, some guiding principles were proposed for data collection within the Acacia Initiative. You need to consider the same principles when establishing a system for analyzing data and reporting back to stakeholders. These principles can be summarized as follows:

- The information needs of the different telecentre stakeholders should guide the data analysis.

- An effective stakeholder information system should be established to ensure that stakeholders, from the local to the national and international levels, receive information in a form that is understandable and useful to them and facilitates their participation in interpreting the results.

- Each telecentre study has significance for local decision-making and is important in its own right, but together all the telecentre studies form an international research framework for comparative analysis. Therefore, analysis should also facilitate meaningful comparisons across telecentre projects.

- Data sets are valuable, not only for analysis of data in the short term but also for future research questions. Acacia data sets should be deposited in a common database to make the data available to bona fide researchers in the future.

6.2 Implications for analysis

The suggestions for analysis discussed here include good practice for any research or evaluation study. They are doubly important when researchers plan to make comparisons between case studies, as the ability to meaningfully compare data

depends on the confidence one has that the data have been derive from equivalent phenomena. The preparation and analysis of data, especially survey data, are skilled tasks, for which researchers require an understanding of the assumptions they are testing, the meaning of the variables in the real world, and the statistical tests appropriate to each. You can find a number of suggestions for further reading in the bibliography on analysis, but it is strongly recommended that the research team include analytical expertise or find a local expert to help with this part of the study.

6.2.1 Documentation

In the haste and excitement of getting the analysis under way, it is easy to forget to keep adequate records of the process. At the time, everyone knows what variable labels and shorthands mean and which variables they will manipulate in which ways to create dummy variables and indices. In the next round or in the next case study, their meanings are forgotten or opaque. Errors creep in, which are hard to trace. If the Acacia Initiative is to test its own hypotheses, then it is vital that each telecentre study include careful documentation of the definitions of variables, creation of new variables and indices, and manipulation of the data and samples. In general, it is good practice to provide enough documentation in technical reports to allow readers and other researchers to judge the weaknesses and strengths of the data and their analyses for themselves.

6.2.2 Coding categories

For the Acacia telecentre studies, an additional advantage of agreeing on some common coding protocols and even some common coding categories for a core set of questions and data is that they enormously simplify the task of comparative analyses and reduce the risk of error. Time spent getting the teams to agree at the outset on coding protocols will benefit everyone later on. Standardization can range from the use of the same ranges for asking and coding respondents' ages (20–29, 30–39, etc.) to using the same number codes in data processing. For example, it is common to use the code "0" for an item that is inappropriate or inapplicable to a respondent and to use "9" for missing information or a nonresponse. Likert scales are commonly coded using 5 points, where 1 is the most favourable or positive response; 5 is the most negative response; 9 is used to record an uncodable or nonresponse; and 0 means the question was inapplicable to the respondent. Standardizing these codes within any questionnaire has also been found to reduce coder error.

It is also useful to hammer out some of the more complex issues in coding before starting the analysis, such as how to code complex responses if the respondent can give as many answers as they wish; whether to use two-digit codes if more than nine response codes are allowed or to break the codes down into two smaller categories; when to collapse codes because too few cases are given for some items; and when to code variables, such as household income or money spent on communications, as individual amounts or as ranges, even when the question may have been asked as individual amounts.

6.2.3 Questions to review before analysis begins

Even if the research and evaluation team started out with some initial hypotheses, it is useful to review the project and the research design, as a prelude to deciding on an approach to the analysis in light of the data-collection experience. Some questions for the research team to discuss at this stage are the following:

1. What is our theoretical model, and what are our assumptions? What alternative hypotheses can we test? How will we treat causal sequences?

2. What kind of sample do we have as a result of our surveys and our use of other research methods? Does it include a probability sample from a reasonably adequate frame that allows us to make some statistical inferences for a known population?

3. Given the ways we treated missing information, was the response rate adequate to reduce biases to acceptable levels?

4. Did our questions in the survey or group discussions elicit the right kind of information, or should we treat some data with caution or even discard them?

5. Who, in practice, were the respondents, and did they satisfy our initial assumptions about the unit of analysis?

6. Which phenomena are we trying to explain in the study (behaviours, attitudes, or situations) and which are our dependent variables?

7. What problem data do we have, such as extreme cases or differential errors that skew our variables, intercorrelations between predictors, or interaction effects; and how will we treat these — statistically or in qualitative interpretation?

8. What conclusions can we draw from the data, and what other information do we need to add?

6.2.4 Variables and indices

It is important to recognize that measured variables are rarely, if ever, exactly the same as theoretical ones and that these limitations in the data will constrain the validity of the theoretical model. For example, measured household income is not the same as actual household income, not only because the cash amount given in an interview may be inaccurate but also because other noncash income that may affect the disposable cash available for telecentre services may not be included. Researchers can also manipulate variables to create various types of scales, particularly ordinal and interval scales, which enable them to apply various types of statistical tests. Variables are sometimes a response to a single question, and they are sometimes constructed out of a combination of answers to several questions or observations. Researchers can combine these initial variables to create indices, either by simply adding them or by some other means.

6.2.5 Computer statistical programs and common sense

Several good spreadsheet programs and statistical packages are available to use in manipulating and analyzing data, in addition to programs to enable the evaluators to enter questionnaire survey data directly into the computer. These are available for desktop computers. The most widely available spreadsheet programs are probably Microsoft Excel and Corel Quattro Pro, and the most widely available statistical packages are SPSSX and SAS. Microsoft Access is a powerful relational database program that allows the researcher to manipulate, group, and compare data.[7] Each of these programs has some particular strengths in performing the type of analysis required in a telecentre evaluation, and the evaluation team may be able to convert between some programs, although this is not always easy. The same rationale urged throughout these guidelines for using comparable methods, research instruments, and coding categories also applies to the analysis of data:

[7] Mention of a proprietary name does not constitute endorsement of the product and is given only for information.

researchers will facilitate comparison across the Acacia telecentre case studies by sharing common approaches to data analysis.

Another important point to make about statistical analysis is that the power of computers seduces us into trying everything and running every statistical test, without imposing much previous judgment or theoretical structure, with the result that we have an embarrassment of riches when it comes to interpreting the results. The hidden costs of easy statistical computer programs include the considerable time spent in trying to figure out what all the tables generated actually mean. An effort at the outset to think through the key variables and relationships deserving of analysis is very worthwhile, and disciplining oneself not to throw everything into the statistical-software "pot" is a wise practice. It is recommended that the researcher not only clearly label distribution tables, so that the results are easily read, but also spend time reviewing the tables for patterns and possible problems in the distributions for later analysis.

In the end, the most important test of all is common sense in the search for the structure of relations among variables.

6.3 Acacia Stakeholder Information System

These guidelines have throughout stressed the importance of a stakeholder information system. The research and evaluation projects of pilot community telecentres are themselves pioneering studies, with a significance for community leaders, local entrepreneurs, private investors, government policymakers, and international donors. Each of the stakeholder groups needs information on the telecentres' performance and wider economic and social impacts on the community, as such information is relevant to their decision-making. It has been emphasized that these considerations should influence the research and evaluation project from the initial design stage through to data collection and analysis.

The research teams will develop systems to report to their various stakeholders and make these systems both appropriate to the stakeholders' needs and manageable in terms of the resources available to the project. These reporting systems should not be the only ways evaluators obtain feedback from stakeholders and periodic interaction with them. In some cases, specific agreements with stakeholders, such as donors and government departments, will mandate the timing of reports. In the case of local authorities and community groups, the project timetable and the schedule of visits to the community will guide the timing of the reports. The following are proposed as complementary elements in a multifaceted stakeholder information system for Acacia.

6.3.1 Acacia Telecentre Research Network

ATRN is an electronic discussion group (atrn-cl@lyris.idrc.ca), established early in 1999. It includes the research teams of the Acacia projects, plus other interested researchers who ask to join. It is available for posing problems and suggesting solutions, as well as sharing ideas and research results. Eventually, its archives will become a valuable source of information on the evolution of ideas in the group. It will be important for Acacia researchers to lead the discussion group, perhaps by rotating the moderator's role between research teams, so that ATRN primarily serves the need for collaboration among Acacia pilot telecentre projects. Later, as new projects and networks come on stream, the focus of ATRN will likely shift to other research issues. ATRN is a subset of a wider open electronic discussion group on telecentres, also hosted by IDRC (telecentres-l@lyris.idrc.ca), which addresses issues in the operation of community telecentres and shares experiences across regions.

6.3.2 Acacia research-data archives

The Acacia Initiative is considering how to establish a repository for research instruments and data to support collaboration among its projects and provide a facility for comparative research across projects. These guidelines provide a starting point for collaboration in research design, sampling strategy, and the design of research instruments. Sharing research instruments, such as questionnaires, will strengthen the basis for comparative data analysis at a later stage. Eventually, research results and data sets will also be available from the Acacia archives.

One alternative for hosting and managing the data archives is to identify a research institution, preferably in Africa, with the technical and staff resources to provide the necessary archiving services and respond to requests for information and data while limiting access to data to legitimate institutions with appropriate safeguards in place. Another possibility is an institution in a developed country or one of the donor organizations. Guidelines will need to be in place to determine who can access what level of disaggregated or aggregated data, after what time period, and for what purpose. These issues are presently under discussion.

6.3.3 Telecentre operators' forum

USASA, the agency responsible for telecentres in South Africa, has recommended that an electronic forum be established for telecentre operators to share ideas and experiences. This would seem to be a useful mechanism, and, if possible, it should

be extended beyond South Africa. It might also allow researchers to share some basic monitoring information on equipment use and performance, as long as this does not compromise business competitiveness. Another important role for an operators' forum would be in the implementation of training and distance-learning programs.

6.3.4 National stakeholders

In the four pilot-project countries for Acacia (Mozambique, Senegal, South Africa, and Uganda), specific mechanisms have been established to bring the various national stakeholders together in a National Steering Committees for Acacia. These committees include representatives of key sectors, such as telecommunications, universities, other research institutions, government departments, and the private sector. These structures facilitate the involvement of national stakeholders in the community telecentre projects, and they are a key audience for reporting, as well as key participants in the process of learning through discussion.

One important objective of the projects for government departments (beyond those directly responsible for telecommunications) will be to learn about the communities' needs for government information, which the local people look to the telecentres to provide. This need has implications for how government makes information accessible to the public, how rapidly it will put its services online, and how open it will be with information and access to assistance from its staff. All departments that should have this information are not likely to be part of the Acacia National Steering Committees, so Acacia should consider a wider dissemination of results across federal departments.

Where possible and appropriate, results and summary reports from Acacia projects should be posted on certain government websites, including Acacia's and those of participating organizations. This will make information more accessible to interested members of the public and may make the government departments, themselves, more aware of the role and potential of community telecentres and how they are affecting the local and national situations.

6.3.5 International partners

For some time, it has been felt that the community telecentre initiatives under way in various parts of Africa represent an important learning opportunity, not only at local and national levels, but also at that of international organizations examining their programing with respect to ICTs. This consideration led to the establishment

of both the Partnership for ICTs in Africa group, which includes the World bank, United Nations Development Programme, World Health Organization, USAID, the Carnegie Foundation, Kellogg Foundation, and IDRC, and the funding partnership between UNESCO–ITU and IDRC, which covers some of the Acacia projects.

The Acacia Initiative has also developed inside of a regional framework policy approved by African governments: the Economic Commission for Africa's African Information Society Initiative. This facilitates the ministerial and technical links from Acacia and its projects to other ICT initiatives in Africa and provides another forum for exchange of information and learning.

As an initiative of IDRC, Acacia is also well placed to play a key role in enabling Canadians to learn how best to increase access to ICTs in sub-Saharan Africa. Clearly, the Acacia Initiative is part of several important networks in Africa and the world that are interested to learn about ICTs and will influence future investment and policy responses. Acacia will take every appropriate opportunity to enable the research findings to reach these key organizations, in addition to ensuring that its electronically posted reports are linked to the appropriate websites and get maximum visibility in the organizations and networks most important to its goals.

6.3.6 Local stakeholders

Perhaps the most important stakeholders for Acacia are local, and each project will need to consider with local leaders how best to provide both feedback and learning for the communities. To some extent, the feedback can be structured along lines of the strata selected for study. Thus, the various groups, such as telecentre staff, users, students, key organizations, women's groups, and chambers of commerce, can be called together to hear the results of relevance to them and discuss their implications for change or future action. It is also a good strategy to sometimes mix these stakeholders up in later focus groups or stakeholder meetings, to generate more interactive discussion across the community.

Key stakeholders, such as political leaders and leaders of institutions and organizations in the community, should receive more personal and detailed feedback, both within and across groups. Feedback meetings should take place before the evaluation team makes its final decisions about the next round of data collection, so that it has genuine opportunities to modify the research plan to take the stakeholder feedback into account. This also prepares the local stakeholders and their leaders to cooperate in the next round of data collection and reminds them of the goals of the study and how the evaluation can be useful to them.

It is also valuable to post the key issues and perhaps the decisions identified in the stakeholder feedback process so that everyone can learn from them. This can be done in various ways: by writing articles for the local newspaper or community news sheet, talking on local radio, posting information outside the telecentre or some other central building, or giving presentations to particular groups, such as schools, chambers of commerce, or farmers' associations. Another important mechanism for posting information is the telecentre's own website, if it has one.

6.4 The Evaluation and Learning System for Acacia

These guidelines are designed to provide ideas and guidance on research and evaluation of community telecentres for research teams working within the Acacia Initiative and its partners. The guidelines are based on a review of good practice in the various aspects of research and evaluation design, collection of data, and the analysis of results. The guidelines have emphasized throughout that stakeholders should be included in the process, that their needs for information should be met, and that the studies should include the participation of local people and local institutions. Above all, the guidelines have emphasized the importance of using common research frames, models, methods, instruments, indicators, and analyses to not only strengthen individual studies but also provide a common ground for the Acacia Initiative to test broader hypotheses on the role and impact of community telecentres on information and communications and sustainable development in Africa.

The Acacia Initiative has always been envisaged as a learning venture, with special attention to measurement, evaluation, and feedback at all levels within the and across projects. Acacia can only achieve these goals with some common understanding and language about the social processes researchers are studying and the ways they study them. The process of feedback — called the Acacia Stakeholder Information System — needs itself to be managed and sustained. This is the role of the ELSA component of the Acacia Initiative.

A number of specific tasks in the ELSA portfolio have been proposed in these guidelines, including a facilitating role in the research design of telecentre evaluation studies and in the decisions to be made about data collection and analysis. A host institution is also needed to manage a common data repository (the Acacia research-data archives) and to host the electronic discussion group (that is, ATRN). The telecentres, themselves, may wish to have a network to share information and experience and to set up their own web pages.

Many of these roles are ongoing and are particularly important in anticipating follow-up studies and further data collection. The Acacia Initiative is working with a number of organizations in Africa and the world that are both stakeholders in the Acacia telecentre pilot projects and partners with IDRC in other projects. These partner organizations also look to ELSA to play a key role in furthering their understanding of the potential role of community telecentres in African development.

Abbreviations and Acronyms

AISI	African Information Society Initiative
ATRN	Acacia Telecentre Research Network
CIET	Community Information, Empowerment, and Transparency
ECA	Economic Commission for Africa [United Nations]
ELCI	Environmental Liaison Centre International
ELSA	Evaluation and Learning System for Acacia
ENDA	Environnement, développement, actions (Environment, Development, Action)
ESANET	East and Southern Africa Network
GDP	gross domestic product
GNP	gross national product
ICTs	information and communication technologies
IDRC	International Development Research Centre
ISP	Internet service provider
ITU	International Telecommunication Union
LFA	logical-framework approach
MCT	multipurpose community telecentre
NGO	nongovernmental organization
NRC	National Research Council [United States]
PADIS	Pan African Development Information System
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development
USASA	Universal Service Agency of South Africa

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Assessing Community Telecentres

Guidelines for Researchers

Telephone, fax, email, Internet; telemedicine, distance education, news distribution, telecommuting: these are some of the services offered by the community telecentre. But do telecentres truly respond to the communication and information needs of the communities they are intended to serve? What impact do they have on social equity and economic development? As community telecentres become more commonplace across Africa and in other developing regions of the world, these questions take on an increasing urgency.

This guidebook will assist researchers as they assess and evaluate the role and impact of community telecentres. It provides an introduction to some of the key research issues, a framework for telecentre evaluation, and an impetus for research teams to share ideas, instruments, and methods. *Assessing Community Telecentres* will interest researchers, practitioners, and academics in information science, communications, international development, and evaluation, including telecentre operators, telecentre managers, and community leaders.

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